

**LECTURERS' EXPERIENCES IN THE IMPLEMENTATION OF THE NATIONAL  
CERTIFICATE (VOCATIONAL) ENGINEERING CURRICULUM IN A  
SELECTED TECHNICAL VOCATIONAL EDUCATION AND TRAINING  
COLLEGE**

by

**PATRICIA NINGI SIBISI**

Submitted in fulfilment of the  
requirements for the degree

***MAGISTER EDUCATIONIS***

in **CURRICULUM STUDIES** in the

**COLLEGE OF EDUCATION**

at the

**UNIVERSITY OF SOUTH AFRICA**

SUPERVISOR: PROF. E.C. DU PLESSIS

DATE: 27 November 2019

## DECLARATION BY STUDENT

Name: PN SIBISI  
Student number: 34050647  
Degree: MASTER OF EDUCATION (MED)

I declare that the dissertation titled '**Lecturers' Experiences in The Implementation of the National Certificate (Vocational) Engineering Curriculum in a selected Technical Vocational Education and Training College**' is my own work and that all the sources I have used or quoted have been indicated or acknowledged by means of complete references. I further declare that I submitted the dissertation to originality checking software.



SIGNATURE  
Patricia Ningi Sibisi

2019-11-29  
DATE:

## DECLARATION BY SUPERVISOR

I, Prof EC du Plessis, declare that the dissertation has been submitted to originality checking software.



SIGNATURE

2019-11-29  
DATE:

## **ACKNOWLEDGEMENTS**

I would like to thank the Almighty for giving me health and strength during the journey of this study and my life. Several people contributed to the successful completion of this dissertation in different ways. My heartfelt thanks goes to:

- My supervisor, my mentor Professor Elizabeth du Plessis, for her expert guidance and encouragement. Thank you for your constructive criticism that propelled me to seek deep knowledge about this study. I would not have managed to complete this study without your continuous support. Thank you for believing in me.
- Prof G van den Berg for your continuous support, guidance and pushing me to study even when I saw it impossible. Thank you for all the opportunities.
- Prof V Gasa for providing all necessary academic support and encouragement.
- DHET, TVET college management and staff for providing data for the study.
- My colleagues and friends for assistance and support.
- Dr Siphwe Gumede for being a friend, guru, mentor, motivator, critical reader, supervisor, ICT specialist and for always making time for my development.
- Mr Thulani Sithole for being a friend, mentor and my legal advisor.
- Dr A Musundire my academic mentor, thank you for your continuous support.
- My late grandmother Mrs MaDuma Sibisi for instilling education in our family.
- My parents Mr and Mrs Sibisi for encouraging me to study. My journey was started by them and they are still supporting me in every way.
- My siblings for undying support always. Thank you for believing in me.
- My aunt, MaMkhize Hlela for playing a big role in making the woman I am today.
- My fathers, mothers, cousins, aunts, uncles for their love and support.
- My children Zimele and Aphelele who gave me many reasons to continue.
- Aphelele my editor and personal assistant.

**‘UMUNTU UMUNTU NGABANTU’**

## **ABSTRACT**

South Africa is facing a challenge regarding the shortage of South African (SA) engineers. The National Certificate (Vocational) (NC(V)) was introduced by Department of Education (DoE) in 2007 to address this challenge. However, there has been a cry and dissatisfaction from the government, industry, community and other stakeholders that NC(V) engineering curriculum is not addressing the shortage of engineers. SA has one engineer per 2 600 people compared to international norms, where one engineer serves 40 people. It has been ten years since the introduction of NC(V) curriculum, SA should not be in this state of importing engineers if the NC(V) engineering is achieving the goals of National Development Plan 2030.

Since lecturers are the implementers of the NC(V) engineering curriculum, it was necessary to investigate their experiences in search for improvement of the curriculum and to find out the challenges facing lecturers which are hindering the success of this curriculum. Lecturers, Senior Lecturers and a Head of Department (HoD) as the primary implementers of the engineering curriculum were involved in the study as participants. There were 15 participants for this study who are lecturing in one selected college but at two different campuses which is why the qualitative research approach was employed, making use of a multiple case study. They took part in semi-structured individual interviews and shared their experiences with the researcher. Their experiences revealed that lecturers are experiencing challenges with the implementation of NC(V) engineering curriculum. Their main challenge was the minimum requirement, which is a Grade 9 pass. Their concern was that no matter what they try, a learner who has not mastered Mathematics up to Grade 12 will struggle with engineering subjects. Emanating from this challenge, low attendance rate, low pass rate, low throughput rate and high drop-out rate is experienced by participants every year.

One of the aims of the Transformative Learning Theory (used as one of the theories in the theoretical framework) is to allow lecturers to identify challenges and design improvement plans on their own. This study has indicated that Technical Vocational Education and Training (TVET) colleges have challenges that are hindering teaching and learning. It was evident that some lecturers believe that government officials

should resolve such challenges. However, on engaging with different lecturers they realised that they have the capacity to address classroom-based challenges. If this can be the case in every college, teaching and learning will improve because that will mean lecturers are focusing on teaching and learning and taking ownership of their subjects and students. The governance challenges, such as reviewing the NC(V) curriculum yearly, provide subject specific training to upskill lecturers and implementing Work Integrated Learning (WIL) in the professional development of lecturers were recommended to be addressed by the Department of Higher Education and Training (DHET).

**Key words:** Engineering, Lecturing, National Certificate (Vocational) (NC(V)), Professional development, Teaching, Technical Vocational Education and Training (TVET), Work Integrated Learning (WIL)

**Izinto ezihlangabezane nabafundisi ngesikhathi belandela uhlelo lwemfundo, phecelezi *National Certificate (Vocational) Engineering Curriculum* kwikholeji ekhethiwe yemfundo ye**

**NGAMAFUPHI**

INingizimu Afrika ibhekene nenselelo mayelana nokusweleka konjiniyela. Uhlelo lwemfundo i*National Certificate (Vocational) (NC(V))* lwethulwa wuMnyango wezeMfundo ngonyaka ka 2007 ukuze uxazulule le nkinga. Yize-kunjalo kuye kwaba khona ukungagculiseki ngasohlangothini lukahulumeni, lwezimboni, lomphakathi kanye nakwezinye izinhlobo ezidlala indima yenkinga yokuntuleka konjiniyela. INingizimu Afrika (SA) inonjiniyela oyedwa kubantu abayi 2 600 uma iqhathaniswa nezinga lomhlaba lokuthi unjiniyela oyedwa kufanele ibhekane nabantu abayi 40. Sekudlule iminyaka eyishumi selokhu kwethulwa lezi zinhlelo, ngakho-ke, iSA akufanele izithole isesimeni sokudinga onjiniyela abavela ngaphandle uma ngabe izinhlelo ezikhona ziyanceda ekufinyeleleni izimpokophelo zoHlelo lwezokuThuthukisa iZwe *National Development Plan 2030*.

Njengoba abafundisi bangabaqhubi bezinhlelo zobunjiniyela, phecelezi NC(V), nokho sasikhona isidingo sokuphenya lokho abahlangabezana nakho ukuze kuthuthukiswe izinhlelo futhi kuvunjululwe izinselele ezibhekene nabafundisi, okuyizinselele ezikhinyabeza impumelelo yalezi zinhlelo. Abafundisi, abafundisi abaphezulu kanye neziNhloko zoMnyango *Head of Department (HoD)* njengabaqhubi bokuqala bezinhlelo bebebambe iqhaza kulolu cwaningo. Abadlalindima abayi 15 bebefundisa kwikholeji ekhethiwe, kodwa emagatsheni amabili ehlukene, lokho okwenza isizathu kusetshenziswe uhlelo locwaningo oluzinze kwizingxoxo, ngokusebenzisa izinhlobonhlobo zocwaningo lotho. Kwenziwe izinhlobo ezimbaxambili zocwaningo kanti abadlalindima bavezele umcwaningi ulwazi lwabo. Baye baveza ukuthi behlangabezane nezingqinamba uma besebenzisa izinhlelo zobunjiniyela NC(V). Inselele enkulu abahlangabezane nayo kuye kwaba yisidingo sokuphumelela uGreyidi 9. Inkinga enkulu yabo ukuthi bethi bezama ngamandla kulokho abakwenzayo, umfundi owehluleke esifundweni seMethamethiki ukufikela kuGreyidi 12 uzohlangabezana nobunzima ukuze aphumelele ezifundweni zobunjiniyela. Okubhebhethekiswa yile nselele, yizinga eliphansi labafundi abahambela lesi sifundo, izinga eliphansi labafundi

abaphumelelayo kanye nezinga eliphezulu labafundi abayeka ukufunda njalo nje ngonyaka.

Enye yezinhloso zethiyori yemfundo eguqulayo (*used as one of the theories in the theoretical framework*) ukuvumela abafundisi ukuba bakwazi ukubona izinselele futhi badizayine izinhlelo zokuzithuthukisa ngokwabo. Lolu cwaningo luye lwaveza ukuthi amakholeji. Phecelezi *Vocational Education and Training (TVET) colleges* ahlangebezene nezinselele eziphazamisa uhlelo lokufunda nokufundisa. Kuye kwacaca ukuthi abanye abafundisi babekhohlelwa ekutheni abasebenzi bakahulumeni kufanele baxazulule izinselele ezinjengazo lezi. Yize-kunjalo, ngemuva kokuxoxisana nabafundisi abahlukahlukeni, baye bazwisisa ukuthi banamandla okuqeda izinselele ezisemagunjini okufunda. Uma ngabe lokhu kuyenzeka ngempela kuwo wonke amakholeji, ngakho-ke uhlelo lokufunda nokufundisa luzothuthuka ngoba lokho kuzochaza ukuthi abafundisi bagxile ohlelweni lokufunda nokufundisa kanti ngokunjalo baba yibo abalawula izifundo kanye nabafundi babo. Izinselele zokuphatha, ezinjengokubuyekezwa kohlelo lwemfundo, phecelezi NC(V) njalo nje ngonyaka, lunikeza ukuqeqeshwa okuthile okuthuthukisa abafundisi. Ukulandela uhlelo lwemfundo oluhlangene nomsebenzi olumayelana nokuthuthukiswa ngokomsebenzi wabafundisi kuyinto enconywe ukuba ilungiswe uMnyango weMfundo ePhakeme kanye nokuQeqeshwa (*Department of Higher Education and Training*).

**Key words:** Ubunjiniyela, Ukufundisa, isiTifiketi seZwe seMfundo (*National Certificate (Vocational) (NC(V))*), ukuthuthukiswa ngokoMsebenzi, Ukufundisa, Imfundo kanye NokuQeqeshwa ngoKolwazi kanye nangamaKhono (*Technical Vocational Education and Training (TVET)*), Uhlelo lweMfundo oluHlangene noMsebenzi (WIL)

**Dosente se ervaring van die implementering van die Ingenieurskurrikulum vir die  
Nasionale Sertifikaat (Beroepsgerig) in 'n bepaalde kollege vir Tegniese  
Beroepsgerigte Onderwys en Opleiding**

**OPSOMMING**

'n Tekort aan ambagslui staan Suid-Afrika in die gesig. Om hierdie rede het die Departement van Onderwys in 2007 die Nasionale Sertifikaat (Beroepsgerig) (NS(B)) ingestel. Tot die ontevredenheid van die regering, die bedryf, die gemeenskap en ander belanghebbendes vul hierdie kurrikulum nie die tekort aan nie. In Suid-Afrika is daar een ambagspersoon vir elke 2 600 mense teenoor die internasionale norm van een ambagspersoon per 40 mense. Hierdie kurrikulum is meer as tien jaar gelede ingestel en SA moet tans ambagslui invoer. Die oogmerke van die Nasionale Ontwikkelingsplan 2030 word dus nie verwesenlik nie.

Aangesien dosente die NS(B) kurrikulum vir werktuigkundiges implementeer, moes hulle belewenisse ondersoek en hulle probleme bepaal word om die kurrikulum te verbeter. Dosente, senior dosente en departementshoofde, as die implementeerders van hierdie kurrikulum, het aan die studie deelgeneem. Die 15 deelnemers is verbonde aan een kollege wat twee kampusse het. Daarom is 'n kwalitatiewe navorsingsbenadering gevolg en 'n veelvuldige gevallestudie gebruik. 'n Halfgestruktureerde onderhoud is met elke deelnemer gevoer. Uit die onderhoude blyk dat dosente moeite met die implementering van die NS(B) kurrikulum ondervind. Die grootste struikelblok is die minimumvereiste van Graad 9. Al doen hulle ook wat, 'n leerder wat nie Graad 12-wiskunde geslaag het nie, sal tegniese vakke nie kan bemeester nie. Afgesien hiervan is die bywonings- en slaagsyfer sowel as die omset jaar na jaar laag en die uitsaksyfer hoog.

Die transformatiewe leerteorie is deel van die teoretiese raamwerk. Die oogmerk hiervan is dat dosente self probleme aantoon en met verbeteringsplanne kom. In hierdie studie is bevind dat kolleges vir tegniese beroepsgerigte onderwys en opleiding (TBOO) met probleme te kampe het wat onderrig en leer belemmer. Sommige dosente is van mening dat staatsamptenare hierdie probleme moet oplos. Ná gesprekke het talle dosente egter besef dat hulle oor die vermoë beskik om self hulle klaskamerprobleme op te los. As dit van alle kolleges waar is, sal onderrig en leer verbeter omdat dosente hulle op onderrig



en leer sal toespits en vir hulle vakke en studente verantwoordelik sal wees. Vakopleiding word gegee om aan bestuursprobleme, soos die jaarlikse hersiening van die NS(B)-leerplan, die hoof te bied. Daar word aanbeveel dat die Departement van Hoër Onderwys en Opleiding toesien dat werkgeïntegreerde leer deel uitmaak van dosente se professionele ontwikkeling.

**Kernbegrippe:** Ingenieurswerk, Klasgee, Nasionale Sertifikaat (Beroepsgerig) (NS(B)), Professionele ontwikkeling, Onderrig, Tegniese Beroepsgerigte Onderwys en Opleiding (TBOO); Werkgeïntegreerde leer (WIL)

## **LIST OF ABBREVIATIONS**

ACE	Advanced Certificate in Education
AsgiSA	Accelerated and Shared Growth Initiative in South Africa
CFO	Chief Financial Officer
CHE	Council on Higher Education
DP	Deputy Principal
DoE	Department of Basic Education
DHET	Department of Higher Education and Training
EEA	Employment Equity Act
EET	Economic, Equity and Transformative
EIC	Electrical Infrastructure Construction
ETD	Education Training and Development
ETDP SETA	Education, Training and Development Practices Sector Education and Training Authority
FET	Further Education and Training
FETMIS	Further Education and Training Management Information Services
HEQSF	Higher Education Qualifications Sub-Framework
HOD	Head of Department
ICASS	Internal Continuous Assessment
INSET	In-service Education and Training
ISAT	Internal Summative Assessment Tasks
KZN	KwaZulu-Natal
L	Level
LOLT	Language of Learning and Teaching
NATED	National Accredited Technical Education
NC(V)	National Certificate (Vocational)
NDP	National Development Plan
NPDE	National Professional Diploma in Education
NQF	National Qualifications Framework
NSC	National Senior Certificate
NSDSIII	National Skills Development Strategy III
NSF	National Skills Fund
NSFAS	National Student Financial Aid Scheme

OECD	Organisation for Economic Co-operation and Development
QDA	Qualitative Data Analysis
SA	South Africa
SAIVCET	South African Institute for Vocational and Continuing Education and Training
SASA	South African Schools Act
SDA	Skills Development Act
SAQA	South African Qualifications Authority SETA Sector Education and Training Authorities TVET Technical Vocational Education and Training
TLT	Transformative Learning Theory
WIL	Work-integrated Learning

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## **CHAPTER 1**

### **ORIENTATION**

#### **1.1 INTRODUCTION**

The South African (SA) higher education system has generally gone through several curriculum and structural changes. The Technical Vocational Education and Training (TVET) colleges' landscape has undergone various transformational changes in recent years. In 2002, 152 technical colleges were merged into 50 larger multi-campus institutions and renamed FET colleges, and in 2014 as TVET colleges by the then Minister of Higher Education and Training, Dr Blade Nzimande. Currently in 2019, there are 50 public TVET colleges countrywide. The renaming of these colleges was done to reflect their nature better and to align the national educational system with international trends in post-school education and training (Department of Higher Education and Training [DHET], 2013). However, the transformation in the TVET sector was not limited to mergers and name changes. The New Institutional Landscape document (Department of Education [DoE], 2001) recommended that the reformation of technical education should be aligned with the objectives of the SA National Qualifications Framework (NQF). This would include creating a national framework of learning achievements, facilitating access to and progression in education and training, ensuring career paths and enhancing the quality of education and training (South African Qualifications Association [SAQA], 2001).

Furthermore, during 2006, TVET colleges were recapitalised through massive government investment to improve their infrastructure, curriculum, lecturer development and students' funding to access learning programmes (Nkalane, 2015:13). For the DoE to comply with this policy, the infrastructure of the TVET colleges was upgraded to accommodate the new National Certificate (Vocational) (NC(V)) engineering curriculum. As a result, resourced workshops were built, student financial aid provided through the National Student Financial Aid Scheme (NSFAS) and a professional development plan for lecturers was designed (Nkalane, 2015:13). In March 2006, the then SA DoE (Organisation for Economic Co-operation and Development [OECD], 2008) introduced a new qualification, namely NC(V) for TVET colleges, which was implemented in January 2007. NC(V) Level 2, Level 3 and Level 4 (L 2,3,4) was implemented between 2007 and 2009 respectively with level 4 replacing the following FET college

programmes with a phase-in and phase-out process (SAQA, 2013), namely National N Certificates: N1 to N3 engineering and National N Certificates: N4 to N6 Business and Utility Studies.

Over the six-year period (2010-2015), an increasing trend in the number of students enrolled for N1-N6 programmes (Report 191) was noticed (DHET, 2017). “A growth of 206% (from 169 774 to 519 464) was recorded in the number of enrolments for Report 191” (DHET, 2017:30). It is evident that the N courses continued due to many challenges that NC(V) programmes posed to the industry and students.

The rationale for conducting this study stems from the researcher’s engagement as a campus manager at a TVET college in KwaZulu-Natal (KZN), SA from July 2011 to July 2015. Here, the researcher was directly involved with the lecturers in the NC(V) engineering curriculum. Among the researcher’s duties and responsibilities was curriculum management and implementation, assessment and resource provisions. In this sense, the researcher was exposed to challenges and successes experienced within the teaching and learning practice of the NC(V) engineering curriculum.

The value of this study stems from the important role that post-school, adult education and training play in the education, training, preparation and skills development of the labour force in SA. Accordingly, curriculum should be delivered under conducive circumstances by well-equipped, qualified lecturers/facilitators.

Challenges stemming from poor capacity, scarce human resource development and skills shortages of engineers in SA have posed a threat to economic advancement initiatives. It is hoped that this study will assist in exploring the strengths, challenges and available professional development opportunities that lecturers encounter pertaining to their teaching and learning. The study will contribute to the planning of curriculum that prepare engineers for the labour market, and thus ideally inform future teaching and learning practices within the NC(V) engineering curriculum at the selected TVET college in KZN, SA (with the goal of enhancing the throughput rate and quality of students exiting such programmes). In addition, interested parties in similar contexts may also benefit from the outcomes of the research. Although this study does not intend to generalise the findings, but to gain insight in the participants’ experiences, it

could contribute to the evidence/knowledge base in decision-making structures, policy reviews, system improvement strategies and practices employed by the DHET (DHET, 2014).

## **1.2 BACKGROUND TO THE RESEARCH**

Skills development, especially engineering, is a necessity for economic development. Engineering plays an important role in advancing the changes that are taking place in almost the whole world. The background to the research will be discussed to provide the reasons why this study was conducted. The transformation initiatives in this sector were not limited to mergers and name changes. Among the recommendations of the New Institutional Landscape document (DoE, 2001) was to reform technical education and align it with the objectives of the NQF (DoE, 2001). These recommendations further included creating a national framework of learning achievements, facilitating access to and progression in education and training, establishing career paths and enhancing the quality of education and training (SAQA, 2001). “In 2006, TVET colleges were recapitalised through massive government investment to improve their infrastructure, introduce a more relevant curriculum, retrain lecturers and assist college students financially to access learning programmes” (Nkalane, 2015:13). For the DoE to comply with this policy, the infrastructure of TVET colleges was upgraded to accommodate the new NC(V) engineering curriculum. As a result, workshop facilities were built and fully resourced, student financial aid was provided through the NSFAS bursary scheme and a professional development plan was designed for lecturers (Nkalane, 2015). The scarce skills development that negatively affects the country’s economic sustainability in production and services earmarked the implementation of these reforms.

“TVET colleges play a vital role in the skills development and education and training of the SA workforce” (DHET, 2014:1). In view of this, more attention is paid to TVET college policy, both internationally and locally, to develop knowledge, skills and a sustainable economy (UNESCO, 2012). One of the goals of the National Skills Development Strategy III (NSDSIII) (DHET, 2013) is to ensure that the TVET system is responsive to all sector needs as well as national skills needs and priorities. It was in this context that the White Paper for Post-School Education and Training (2013) was designed to strengthen, expand and turn TVET colleges into attractive institutions of choice for school leavers. As a result, student enrolment has increased rapidly since 2010. A total head count of 3 58 393 in 2010 increased to 638618



in 2013 and the projection is 2,5 million by 2030 (DHET, 2018:33). Emanating from this challenge TVET colleges faced, the DHET (2013) reported that several key objectives were formulated to strengthen TVET colleges, to include improvements in governance, quality of education, increasing their responsiveness to labour markets and developing their infrastructure. The implementation of these objectives could improve the quality of education for TVET colleges and will need constant monitoring. In 2015 the enrolment for TVET college students increased to 737 880 (DHET, 2017). The growth in TVET colleges invites collaboration by all stakeholders in resolving challenges so that they acquire investment returns by providing skills shortages and knowledge, which could lead to alleviating poverty and unemployment. Ultimately, the NC (V) enrolment grew from 154 960 in 2013 to 165 459 in 2015 (DHET, 2016).

However, the Sector Skills Plan of the Education, Training and Development Practices Sector Education and Training Authority (ETDP SETA) (2011), indicates that lecturers were not adequately prepared for the introduction of the NC (V) curriculum and this has a bearing on both their content knowledge and teaching and learning practices. In accordance with the aforementioned, Mabale (2012) and Mokone (2011) state that there is a lower level of professional teaching qualifications of engineering lecturers in particular. This is illustrated in the 2009 Annual Survey data for the DHET. Surveys conducted after 2009 do not report on TVET lecturer qualifications. The NC(V) teaching and learning approach involves lectures in theoretical work and practical application at relevant workshops. While theoretical knowledge is assessed through Internal Continuous Assessment (ICASS), and Internal Summative Assessment Task (ISAT) is employed to assess practical application. NC(V) engineering programme is a three- year programme with seven subjects from level 2 to 4. Previously NC(V) engineering programme lecturers taught the National Accredited Technical Education (NATED) programmes as theory and Work-integrated Learning (WIL) as practical at the relevant industries. For example, electrical engineering students would conduct practicals at companies such as ESKOM and Transnet. NATED programmes are different from NC(V) engineering programmes as these programmes enroll students who have completed Grade 12 (passed or failed). NATED has six levels (N1 to N6) of which each level has a duration of three months. On completion of N6, students are expected to do WIL at relevant industries for 18 months. On completion of the WIL period, students can apply for the qualification from the DHET.

In response to challenges experienced at the TVET colleges in general, the DHET has planned to establish the South African Institute for Vocational and Continuing Education and Training (SAIVCET). SAIVCET will be responsible for curricular improvement for TVET and community colleges, material development, the establishment of community colleges, staff development, research and partnerships. Furthermore, SAIVCET will be responsible for advising the Minister on TVET and Community College education (DHET, 2013). In 2016, the DHET reported on the plans to establish the SAIVCET committee and their duties. The appointment of the SAIVCET committee is crucial as it is expected to assist the department in addressing the challenges that TVET colleges experience.

Considering the above background information, the need arose to investigate the challenges, strengths, professional development opportunities and support provisions of lecturers teaching in the NC(V) engineering curriculum at an identified TVET college in KZN, SA. Despite these observed challenges, engineering is largely viewed as a 'scarce skill' within the job market. In the National Development Plan (NDP) for Vision 2030, the Minister of Higher Education highlights the need to address the scarcity of artisans in SA, which includes engineering (NDP, 2011). Furthermore, the Minister compiled the 'National Scarce Skills List: Top 100 Occupations in Demand' where electrical engineers are listed first followed by civil engineers and mechanical engineers (Tancott, 2014). This indicates the importance of developing engineering at all levels. Equally, these skills form part of the NC(V) engineering curriculum offered at the different campuses of the selected TVET college where the study was conducted.

In the next section, the theory guiding the research will be discussed briefly.

### **1.3 THEORETICAL FRAMEWORK**

A theoretical framework is required for every study since it provides direction to the study and is used to compare it with other theories. The framework provides stimuli to read the research report and understand the findings. McEwen and Wills (2014) define theory as a set of logically interrelated concepts, statements, propositions, and definitions, which have been derived from philosophical beliefs of scientific data and from which questions or hypotheses can be deduced, tested and verified. A good theory or set of theories can guide every aspect of your study from formulation of research questions, problem statement, through discussing the findings of your data, analysis and writing conclusions (Simon & Goes, 2011). They further

indicate that a good theoretical framework provides a well-supported rationale for conducting your study and helps the reader to understand your perspective. This process can be done by testing theories, make research findings meaningful and generalizable, establish orderly connections between observations and facts, predict and control situation and to stimulate research.

A theoretical framework is a map that provides guidelines for the study. Ngulube (2018) observes that the theoretical framework is the glue that holds the research components together, and in the absence of this glue, the research design falls apart. A study without a theory cannot generate knowledge towards solving challenges.

The TVET environment will be viewed through the lens of the envisaged empirical research and the subsequent implications, using two theoretical perspectives, namely the Transformative Learning Theory (TLT) and the Constructivist Learning Theory. TLT focusses on the reflection of the lecturer for the improvement of practices, as well as principles related to good teaching and learning practices that may enhance student success rates (Wolf, 2007). Mezirow (2003:6) explains TLT as a “critical reflection of assumptions that may occur either through group interaction or independently”. The theoretical framework will be discussed in more depth in Chapter 2.

One believes that when lecturers discover their strengths and shortcomings in a conducive teaching and learning environment, it might lead to change or improvement. In this study, it is hoped that the TVET college NC(V) engineering programme’ lecturers will share their teaching experiences and improve both theory and practical application of the NC(V).

To clarify important aspects, the key concepts used in this study are discussed in the next section.

#### **1.4 KEY CONCEPTS**

The study defines concepts that assist the researcher to unpack the research problem and questions. This study seeks to explore the lived experiences of lecturers in the NC(V) engineering department.

### **1.4.1 Basic concepts**

#### **1.4.1.1 Lecturers**

Lecturers are people of high standing in the education profession and typically teach across a range of courses at postgraduate level. This includes assessment and course administration, and they usually demonstrate leadership roles in the administration of programmes. UNISA (2015:2) defines lecturers as all academic employees employed to teach. This includes all categories of academic teaching employees (full professor, associate professor, senior lecturer, lecturer, junior lecturer).

#### **1.4.1.2 National Certificate (Vocational)**

NC(V) means the certificate awarded as a final exit qualification to a candidate who has complied with the exit-level outcomes stipulated in the National Education policy on the NC(V) (Level 4). A qualification at Level 4 on the NQF programme is a planned combination of fundamental and vocational subjects leading to a qualification (SAQA, 2013).

#### **1.4.1.3 Technical Vocational Education and Training College**

The name TVET college is an international term applied to a post-school education institution, excluding universities. These colleges offer a range of technical and vocational courses. Maidment (2017) defines a TVET as an institution that provides students with the knowledge and skills required to enter a specific range of professions. She further adds that courses combine education, training, skills development and practical training.

#### **1.4.1.4 Professional development**

Professional development implies learning to earn or maintain professional credentials such as academic degrees in formal coursework, attending conferences, and informal learning opportunities situated in practice. OECD (2009:49) contends that “effective professional development is on-going, includes training, practise and feedback, and provides adequate time and follow-up support”.

#### **1.4.1.5 Curriculum**

“A curriculum is defined as the whole set of learning experiences constituting a particular

qualification or module. Curriculum includes key aspects of teaching and learning, such as What is to be learnt? (content); Why it is to be learnt? (rationale) and the underlying philosophy, how it is to be learnt? (process); When it is to be learnt? (structure of the learning process and how the learning will be demonstrated in creative ways and achievement similarly assessed)” (UNISA 2012:3).

### **1.4.2 Related concepts**

#### **1.4.2.1 Pass rate**

According to Cambridge English dictionary a ‘pass rate’ is the number of people, shown as a per cent, who were successful in a particular exam (University Press, 2008).

#### **1.4.2.2 Throughput rate**

Throughput rate is the number of students who started and finished their studies. The rate is shown as a percentage. Sondlo (2013) further explains that throughput rate is the number of students who are enrolled in a programme and actively engaged in teaching and learning activities and complete the course within the minimum or maximum time.

#### **1.4.2.3 Technical Vocational Education and Training Policies and Procedures**

Arfo (2015) in the study entitled ‘A comparative analysis of TVET policy in selected African countries’ made a significant contribution, not only to the policy making process and policy implementation but also to the relationship between policy and practice from both a global and a South African perspective in TVET skills development. Like some of the other research work the study, however, lacked attention on relating these policy procedures to the implementation of TLT, which focuses on the reflection of the lecturer for the improvement of teaching practices (Wolf, 2007). Instead, Arfo (2015) gave more attention to the human capital theoretical perspective, which has received attention from some researchers without bearing much fruitful results in providing practical solutions to TVET challenges.

It is not the initiative of this study to cover definitions of policy and related theoretical policy formulation procedures. However, there is need to confirm the assumption that classical and systems theory is an effective tool for addressing challenges associated with a lack of total

involvement. Such challenges are based on the view that various stakeholders are not involved in policy making and implementation processes, including a needs analysis for the progress and enhancement of the TVET colleges (Hanekom, 1987; Arfo, 2015; Naicker, 2005). This means that the policy making stakeholders of technical and vocational education and training comprising of industry, community, government, lecturers, students, labour unions and private sectors, have the opportunity to contribute to the development of the sector including skills development strategies. Such type of consensus is associated with a higher morale, which is necessary for successful implementation; greater commitment and better understanding of any change and innovation (Gross, Guiaquinta & Bernstein, 1971; Hanekom, 1987; Arfo, 2015). However, one still needs to know if it is the current situation in the SA context. It may be true that as a comparative study globally provides an opportunity for identifying best practices for policy improvement in TVET (Arfo, 2015).

Considering the nature and characteristics of this post-apartheid TVET legal framework, Willemse (2002) argues that any specific policy regarding skills development is guided and directed by long-term legal outlines in order to support and eradicate unemployment and social and economic challenges. According to Meyer (2007) the Skills Development Act (SDA), Employment Equity Act (EEA) and the South African Qualifications Authority Act (SAQA) are critical and important for change in the post-1994 period. These acts-initiated changes in the skills development Education Training and Development (ETD) practices for lecturers. Collectively, Arfo, (2015) and Human Resource Development Strategy for SA (HRDCSA) (2014) in the context of post-apartheid SA.

TVET colleges identified the following policy, legislative framework and entities influencing skills development:

- South African Qualifications Authority Act No. 58 of 1995
- Further Education and Training Act (16 of 2006) (RSA, 2006)
- The Skills Development Act 97 of 1998
- The Education White Paper 4 of 1998
- National Plan for Further Education and Training colleges 2008
- White Paper for Post-School Education and Training 2013
- Accelerated and Shared Growth Initiative in South Africa (AsgiSA)

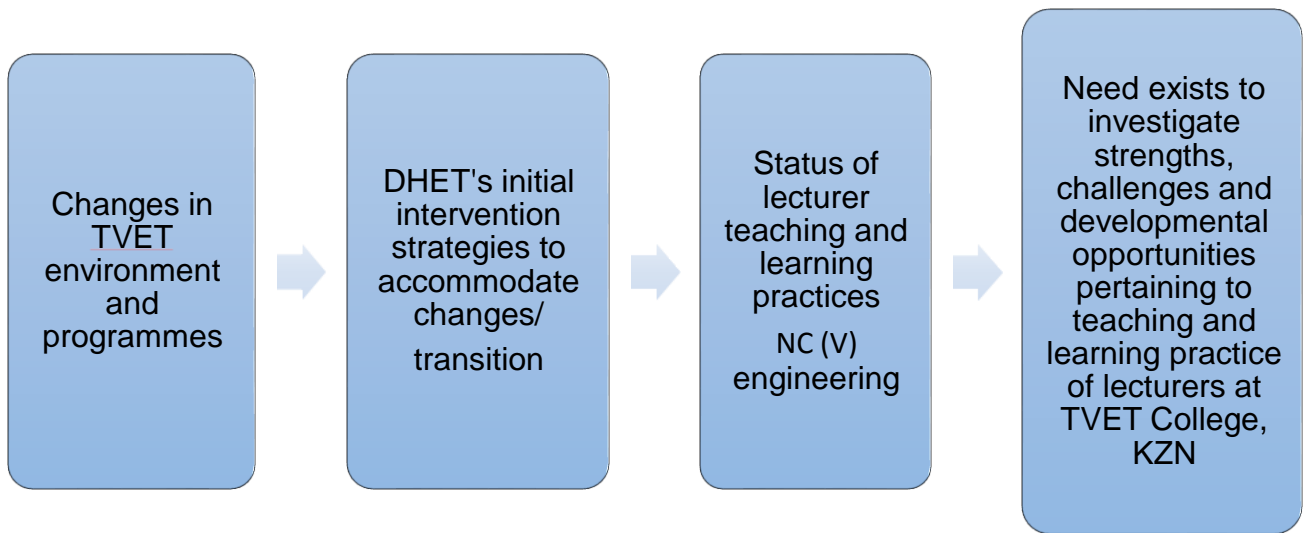
- Sector Education and Training Authorities (SETAs)
- National Skills Fund (NSF)
- Policy on Professional Qualifications for Lecturers in Technical and Vocational Education and Training (2013)

It is not the purpose of this research to analyse policy by policy as of now but to analyse both the achievements brought by the policies and the challenges still encountered by the policies. Furthermore, the study makes an analysis of the policies in general through the application of the TLT.

## **1.5 PROBLEM STATEMENT AND RESEARCH QUESTIONS**

The problem statement is the baseline of the study as it presents the need to conduct the research. Research was introduced to address problems and provide information about the title chosen by the researcher. To address the problem, research questions have to be formulated to gather data. The TVET colleges were redesigned to suit the demand to match the global skills' needs. During the transition, lecturers were at the forefront in the implementation of the new curriculum and had to adapt by introducing new ways of teaching. Among the changes advocated, were the targeted groups, teaching and assessment style, classroom management and other new responsibilities. Change is dynamic and always comes with discomfort where people need time to adapt, learn new ways and conform to change. This study seeks to understand the lecturers' experiences during this transition and the current situation.

Figure 1.1 illustrates how the problem statement was formulated, hence the need to investigate the topic. It was due to multiple changes imposed on TVET lecturers to implement and adapt to the new system of teaching, assessing and reporting.



**Figure 1.1: Key factors contributing to the research problem**

There is a need to investigate the experienced challenges, strengths, professional development opportunities and support provisions of lecturers in the NC(V) engineering curriculum in their teaching and learning practices at a selected TVET college in KZN. This is due to the low throughput and high dropout rates in the NC(V) engineering programmes in SA. The investigation will be conducted to determine the implications for the research findings for improved practice and ultimately the improvement of throughput rates and quality of graduates. The problem identified needs to be investigated since NC(V) challenges delay the plan to address the skills shortages in SA.

Emanating from the problem formulation, the main research question was formulated as: What are the lecturers' experiences in the implementation of the NC(V) engineering curriculum in a selected TVET college?

In the light of the main question, the sub-questions posed next serve as key foci for the research study:

1. What are the views of the lecturers about the NC(V) engineering curriculum?
2. What challenges do lecturers face in implementing NC(V) engineering curriculum?
3. What support programmes do lecturers receive to assist them in implementing the NC(V) engineering curriculum



## **1.6 RESEARCH AIM AND OBJECTIVES**

The aim of the study is to explore the lecturers' experiences in the implementation of the NC(V) engineering curriculum in a selected TVET college.

The objectives of the study are as follows:

1. To explore the views of the lecturers about NC(V) engineering curriculum.
2. To find out what challenges lecturers encounter in the implementation of the NC(V) engineering curriculum.
3. To learn about the support programmes that are available to lecturers to assist them in implementing NC(V) engineering curriculum. Having stated the research problem, research question, the research aim and the objectives, the following section briefly focuses on the research methodology.

## **1.7 RESEARCH METHODOLOGY**

It has been indicated in previous sections that this study is aimed at exploring lecturers' experiences in the implementation of the NC(V) engineering curriculum in a selected TVET college. This section gives a brief overview of the research design and methods used to investigate the research problem. Although a detailed account will appear in Chapter 3, the research design and methods, as well as ethical considerations are discussed briefly next.

### **1.7.1 Research design**

Research design can be thought of as the logic or master plan of a research study that sheds light on how the study is to be conducted. It shows how all the major parts of the research study – the samples or groups, measures, treatments or programmes, work together to address the research questions. Research designs are the specific procedures involved in the research process: data collection, data analysis, and report writing (Creswell, 2012:20). The research design is the actualisation of logic in a set of procedures that optimises the validity of data for a given research problem or research questions. According to Mouton (1996:175) the research design serves to "plan, structure and execute" the research to maximise the "validity of the findings". It gives directions from the underlying philosophical

assumptions to research design, and data collection. Yin (2003:19) adds that the “colloquially a research design is an action plan for getting from *here* to *there*, where ‘here’ may be defined as the initial set of questions to be answered and ‘there’ is some set of (conclusions) answers”. To enquire about lecturers’ experiences, an interpretive design will be suitable.

A discussion of the research paradigm, research approach and research type to illustrate the research design is discussed next.

#### 1.7.1.1 Constructivist research paradigm

Babbie (2007:31) defines a paradigm as a “fundamental frame of reference used by researchers to organise their observations and reasons”. The constructivist-interpretative paradigm was employed because it is relevant to the study in providing an opportunity to conduct interviews and interpret data. The constructivist-interpretative paradigm is flexible to assist the researcher during interview sessions with lecturers to gain understanding of their lived experiences.

A constructivist-interpretative paradigm will be adopted in the study to obtain first-hand information about participants’ accounts of their views, feelings, perceptions and experiences (Cohen, Marrion & Morrison, 2007). Mertens (2010) explains that qualitative data collection methods such as interviews, observations and document reviews are predominant in the constructivist paradigm, which aims to understand the complex world of the participants. This paradigm will further allow the researcher to develop an in-depth understanding of the factors that influence the teaching and learning practices of lecturers at the TVET college, in different NC(V) campuses offering engineering programmes.

#### 1.7.1.2 Research approach

Creswell (2009) asserts that through qualitative research, the researcher can explore the life worlds of participants through semi-structured interviews. A qualitative research approach will assist the researcher in understanding the relevant lecturers’ experiences and perceptions of their own teaching and learning practices, the challenges, strengths and available professional development opportunities in the NC(V) engineering

curriculum at a TVET college. The aim is to understand the factors influencing their teaching and learning practices in the relevant NC(V) engineering curriculum at a TVET college. In this study, the researcher seeks to describe, interpret and evaluate the perspectives of lecturers in the NC(V) engineering curriculum pertaining to their teaching and learning practice and professional development support opportunities.

#### 1.7.1.3 Research type

‘A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not evident’ (Yin, 1984:23). The researcher seeks an in-depth understanding of the interaction between phenomenon and context (Lacono, Brown & Holtham, 2011). In this research, the multiple case study will focus on the challenges, strengths and professional development opportunities that affect the teaching and learning practices of lecturers within the context of the NC(V) engineering curriculum at the selected college.

### 1.7.2 Research methods

Research methods are used to conduct the actual research. These tools assist the researcher to gather information from participants or documents. In this section, there will be a discussion on how data will be collected, analysed and stored.

#### 1.7.2.1 Selection of participants

The researcher has knowledge of the population and its elements, because they possess certain characteristics that make them informative about the topic of interest, (Babbie, 2007; Leedy & Ormrod, 2010; Maree, 2012; Tongo, 2007), in this case, the TVET college sector. The researcher will apply purposive selection of participants and data sets for this study because participants should strictly be lecturers teaching NC(V) engineering curriculum. Purposive selection of participants is a non-probability sampling method in which people, units and/or data sets are chosen for a purpose.

Purposeful selection of participants may range from 1 to 40 or more information rich participants (McMillan & Schumacher, 2006). In this study, a selection of 15 NC(V) engineering curriculum lecturers (including a Head of Department [HOD] and three

senior lecturers) working on different campuses at a selected TVET college were purposefully selected to be participants. The participants should have a minimum of three years' experience working at an NC(V) engineering department. The researcher attempted to maximise variation of the sample in terms of gender, age and experience.

The aim was not to generalise the findings, but to gain insight in the experiences of the selected participants in this specific multiple case study.

#### 1.7.2.2 Data collection

Individual interviews were used as data-gathering instrument. McMillan and Schumacher (2010) claim that D Tape or the digital recording of the interview ensures the completeness of verbal interaction and provides materials for reliability checks. An extensive literature study and a document analysis of statutory and policy documents aid the construction of semi- structured interview questions. An interview schedule is a list of questions to be explored during the interview process. For this study, an interview schedule was used, focusing on broader areas of concern about key research questions of the phenomenon under study. Open-ended and closed questions were asked but limited for the purpose of collecting the demographic information and enhancing the qualitative data. Probing questions were asked to elicit additional information and for further clarity from the responses provided by the participants.

Participant responses were recorded and transcribed to analyse the data. In addition, notes were taken during interviews to refine further questions where necessary and to record non-verbal gestures, which might have useful meanings (Patton, 2002 cited by Oltmann, 2016).

#### 1.7.2.3 Data analysis

Atkins and Wallace (2012) describe data analysis and interpretation as an on-going process, which involves engagement (immersion) with the data until it is fully understood by the researcher. The transcribed data collected from the interviews were analysed by means of inductive analysis, which involves a “process through which qualitative researchers synthesise and make meaning from the data” (MacMillan & Schumacher, 2014; Patton, 2002 cited Oltmann, 2016). This process was done by starting with

specific data, ending with categories and patterns. The latter was used to establish more general themes and conclusions that emerge from the collected data. The coding helps to reduce the vast amount of raw data collected and to focus on the understandings and meanings attached to participants' experiences as NC(V) engineering curriculum lecturers. In a similar vein, the open coding process is used to generate a description of the participants' experiences according to categories and emerged themes. The latter is therefore the guide the researcher uses to make sense of the findings and the subsequent implications. The data, interpretations and findings are reported by means of detailed, 'thick' descriptions in order to provide evidence of the credibility, dependability and confirmability of the data and the findings but only relatively transferable to similar contexts. Such evidence will therefore aid in enhancing the trustworthiness of the research.

## **1.8 MEASURES FOR TRUSTWORTHINESS**

The trustworthiness of a study is ensured when findings of the research study provide the desired answers, understandings and improvements on the specific phenomenon. If research is haphazardly conducted, it can mislead the readers. Olivia (2017) posits that trustworthiness is to establish that the research study's findings are credible, transferable, confirmable and dependable. De Vault (2017) attests to this notion to claim that trustworthiness consists of these terms: credibility, transferability, dependability and confirmability.

The data, interpretations and findings will be reported by means of detailed, 'thick' descriptions to provide evidence of the credibility, dependability and confirmability of the data and the findings but only relatively transferable to similar contexts. Such evidence will therefore aid in enhancing the trustworthiness of the research. The discussions in Chapter 3 will elaborate on these measures.

### **1.8.1 Credibility**

A qualitative researcher establishes rigour of the inquiry by adopting the following credibility strategies: prolonged and varied field experience, time sampling, reflexivity (field journal), triangulation, member checking, peer examination, interview technique, authority of researcher and structural coherence (Anney, 2014:276). Credibility in this

study will be ensured by a purposeful sampling technique and by conducting individual interviews with the participants, making use of relevant questions from the literature and personal experience.

### **1.8.2 Transferability**

Transferability is the external validity that ensures that the study can be transferred to another setting even if another researcher does it. Creswell (2003:34) maintains that to ensure external validity, a rich and detailed description should be provided so that anyone interested will have a solid framework for comparison. The researcher chose the purposive selection of participants from different settings (two campuses) to enable that the findings from the data be transferred to other settings or groups.

### **1.8.3 Dependability**

Ntombela (2018) explains dependability as a fit between what is observed and recorded and what takes place in the natural setting. The researcher made use of a tape-recording to keep evidence of the participants' responses. A variety of participants were used because of their heterogenic and homogenic composition regarding differences in gender, race and positions held in one college, although on different campuses. The selected college is composed of staff from different races: blacks, Indians, coloureds and whites. No one will be excluded because of their differences so that if the study is repeated it produces the same results. Data will be transferred and saved on a hard drive where a password is used to gain access.

### **1.8.4 Confirmability**

Shenton (2004) cautions that to maintain confirmability steps must be taken to help ensure, as far as possible, that the work's findings are the result of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher. Confirmability of the study will be ensured through the participants' narrated responses of their lived experiences, perspectives and opinions within their natural setting.

The above criteria will be met to ensure trustworthiness on which the study can be evaluated.

## 1.9 ETHICAL CONSIDERATIONS

Ntombela (2018) states that ethical considerations are done to satisfy the university that the study will be ethical in all respects. She adds that ethical clearance is done to satisfy the gatekeepers about the purpose of the study. Lastly, she indicates that it informs participants about the purpose of the study and possible consequences/ dangers so that they have a clear understanding (informed consent).

Every effort to conform to the requirements of ethical guidelines will be made as follows:

- Request for permission to conduct the study at the TVET college will be sought from the DHET and the college principal.
- Permission will be sought from the TVET college using the prescribed form - from each campus offering engineering programmes.
- Informed consent forms will be given to all prospective participants to complete as part of the study.
- Data will be stored in a lockable cabinet and on a laptop or hard drive with access/security codes to documents.
- All participants will be informed about the:
  - ✓ goals of the research and what the data will be used for
  - ✓ freedom to choose to participate or not, without having to fear that non participation may have negative consequences
  - ✓ issues related to confidentiality and anonymity as an integral part of their participation in the data collection methods

Participants will have freedom to ask questions and withdraw from the study should they feel uncomfortable.

The researcher will apply for ethical clearance of the study from the university's Ethics Committee.

## **1.10 CHAPTERS' DIVISION**

Chapter 1 provides an orientation to the study. It entails an introduction, personal involvement and rationale for the study. Furthermore, it states the background, theoretical insights that guide the study and key concepts. It also gives a statement of the problem, aim and objectives, research methodology, division of chapters and a summary.

Chapter 2 outlines the contextual, theoretical and conceptual frameworks of the study reviewing a collection of interested theories that will guide the research. It sets forth the literature regarding TVET colleges in international countries, national and local in lecturers' experiences in the implementation of NC(V) engineering curriculum.

Chapter 3 offers a detailed account of the research methodology. Research design deals with the research paradigm, approach and research type. The research methods will include procedures, tools and techniques to gather and analyse data. Trustworthiness and ethical considerations regarding the participation of human beings in the study is discussed.

Chapter 4 presents the analysis and interpretation of the empirical research data. This comprises detailed discussions on the findings of the data collected. It includes comparisons of findings with literature.

Chapter 5 gives a summary of the study, draws conclusions based on the analysed and interpreted data, provides recommendations, and identifies areas for future research.

## **1.11 CHAPTER SUMMARY**

Chapter 1 serves as an orientation for this research. It provides the background of why the study was done which is addressing challenges that are hindering the implementation of NC(V) engineering curriculum in TVET colleges. The theoretical and conceptual framework is briefly discussed and points out TLT as the relevant theory for the study. From this chapter the problem statement and research questions provide information about why the research should be conducted and what the study seeks to find out. Furthermore, the aim and objectives, research methodology were briefly



discussed to present the plan of how the research will be conducted. To ensure that no one is harm or undermined during the study measures of trustworthiness and ethical considerations were discussed. Chapter 1 provided an overview of the changes that has taken place in the TVET colleges and the concerns about the NC(V) engineering curriculum. The NC(V) engineering curriculum has challenges and TVET colleges have numerous challenges, which are be affecting the implementation of NC(V) engineering curriculum. Finally, the chapter division was laid to guide the study.

The next chapter discusses in detail the contextual, theoretical and conceptual, frameworks.

## **CHAPTER 2**

### **CONTEXTUAL, THEORETICAL AND CONCEPTUAL FRAMEWORKS**

#### **2.1 INTRODUCTION**

The purpose of this study is to investigate how lecturers' experiences influence the provision of NC(V) engineering curriculum at a TVET college. As highlighted in Chapter 1, in an attempt to answer the research questions, lecturers' experiences in the implementation of the NC(V) engineering curriculum in a selected TVET college (engineering campuses), need to be explored. The study also finds it necessary to define the concepts used in this study to make the reader understand how the problem was formulated and why the study is being conducted.

In this chapter, the researcher briefly explains the contextual framework by discussing the global and national perspectives on development of TVET colleges before focusing on adult engineering education and training, particularly in the context of post-school training, TVET. This is followed by the theoretical framework, specifically focusing on the influence of TLT in conjunction with the brief explanation of how Constructivist Teaching and Learning Theory is linked to TLT in the SA context. The conceptual framework covers the important concepts to provide a clear understanding of how the problem was formulated. All the discussions will not only explore the current global and local perspectives on adult education and training, but also the experiences of lecturers in the NC(V) engineering curriculum at a selected TVET college with regard to their views on NC(V) engineering curriculum, their professional development, their challenges pertaining to the teaching and learning practice as aligned to NC(V) Policy guidelines and procedures.

#### **2.2 CONTEXTUAL FRAMEWORK**

In the context of this study, there is researched evidence that the global competition in economic markets has become a driving force for economic development. This has also prompted a high demand of expertise and production of a qualitative and efficient work force to suit various sectors of the society and economy, leading to the need of demands in changes and development of new vocational training (Cong & Wang, 2012).

Thus, from a global point of view, the background of the human capital approach in line with the industrial revolution was more focused on productivity in such countries as the United States of America, the United Kingdom, Germany, the Netherlands and Australia, (Tikly, 2013; Maclean & Pavlova, 2013). The focus was on preparing graduates with skills relevant enough for employability by way of meeting requirements in the labour market (Maclean & Pavlova, 2013; Fien, Maclean & Park, 2009). Subsequently, SA advocated the same approach in the TVET colleges by initiating and developing human capital investment to meet the industrial expectations of the country (Tikly, 2013; World Bank, 2011). It was assumed that human capital investment is closely associated with economic growth. For that reason, “TVET colleges were designed to ensure that graduates develop relevant skills that could ensure employability to match the industrial labour force” (Van Loo & Rocco in Van der Vyver, Van der Westhuizen & Meyer, 2013:378).

On the other hand, the sustainable livelihoods approach (UNESCO, 2015), which has also been adopted internationally and eventually in the SA context, is focused on maintaining the aspects of lifelong learning and sustainable economies. It also takes into consideration the information on age and knowledge based on the economy; education that must be accessed by all students; and education geared towards human security (Paris, 2001; Alkire, 2003; UNESCO, 2004; 2005 & Tikly, 2013). In the SA context, the criticism of the sustainable development approach stems mainly from the tension between TVET practitioners’ limited knowledge and skills of the new curriculum delivery methods, economic demands and the quality of performance of students, which is below expected levels.

Because of the high rates of unemployment and under-employment globally, researchers agree that the Economic, Equity and Transformative (EET) approach was introduced to address work force and social demands by articulating TVET geared towards developing skills relevant for work and social life (UNESCO, 2012). In the SA context, the same challenges are still encountered in skills development and teacher development. From a general educational perspective, the definitions of TVET is determined by the level of correspondence between what the society expects in terms

of their educational needs and what suits the socio-economic transformation processes (Grisay & Mahlck, 1991).

Based on the above discussion, the implication is that vocational education is a strategy that contributes to increasing efficiency in educational investment and that can provide young people with industrial skills necessary for employability (Munyao, 2015; Tikly, 2013; Cong & Wang, 2012). Unlike FET, which is a term established by the DHET for local institutions, TVET is an international term. TVET focuses on the acquisition of knowledge and skills for the world of work. TVET encompasses, and draws on the elements of, historical educational terms such as 'Apprenticeship Training', 'Vocational Education', 'Technical Education', 'Workplace Education', and more. For all practical purposes then, it can also be seen as encompassing the principles of South African's 'Further Education and Development'.

Attention to TVET policy is increasing worldwide as the knowledge and skills developed in this type of education are vital for poverty reduction, economic recovery and sustainable development (UNESCO, 2012). Ramaphosa agrees by stating that TVET colleges are therefore of critical importance to the growth of businesses and the further development of the economy (UNESCO, 2015).

One of the goals of the NSDS 111 (DHET, 2013) in SA is to promote the growth of a public TVET system that is responsive to sector, local, regional and national skills needs and priorities. The White Paper for Post-School Education (DHET, 2013) equally states that the highest priority for the DHET is “to strengthen and expand the public TVET colleges and turn them into attractive institutions of choice for school leavers”. “Student numbers in these colleges have increased rapidly, total head-count enrolments have increased from just over 358 393 in 2010 to an estimated 639 618 in 2013 and were expected to increase to one million by 2015 and 2.5 million by 2030” (DHET, 2013:13).

### **2.2.1 Understanding Technical Vocational Education and Training from a global perspective**

According to Psacharopoulos (2006) and Tawil (2012) TVET can be defined from many viewpoints as some definitions focus on political contexts, social contexts (Anderson,

1967; Thompson, 1981); and economic contexts (Psacharopoulos, 1980; Tawil, 2012). From an economic contextual perspective, TVET is an education strategy geared towards increasing the productivity of the work force to stimulate economic growth (Psacharopoulos, 2006; Pierre, 2010; Tawil, 2012). In respect of this view, TVET is regarded as a form of capital investment whose returns would be general economic growth. This according to Psacharopoulos (1980) would be achieved by producing an educated, trained and skilled high-level work force. Closely related to the economic goal is the need to satisfy social demands (Psacharopoulos, 2006; Pierre, 2010; Tawil, 2012).

Although the socio-economic demand is sometimes criticised for putting more pressure on capital investment without focusing on the availability of physical resources. This is the reason why in developing countries, access to technical jobs and other related technical skills were failing to meet the needs of the prevailing economic demands during the colonial period (Anderson, 1967). To cater for the social discrepancies, the social demand approach forced governments in many countries to satisfy the expectations of social demands for the indigenous people to acquire better skills to meet the current economy using available indigenous resources. Other authors linked their definitions to the social justice perspective whereby TVET is seen as a strategy of developing skills despite the quantity or quality of available economic resources to poor communities including marginalised populations such as females, and the disabled. This is done to allow them to access technical skills for employability and productivity (Maclean, 2010; UNEVOC, 2011).

Taking the above into consideration, it is argued that vocational training is about building technical and vocational skills that will enable people to pursue self-employment by opening businesses (Maclean, 2010). Cong and Wang (2012) combine all these aspects when they comprehensively define TVET as a combination of the theoretical and practical forms of education whereby technological and scientific aspects are learnt in respect of different social and economic sectors. This could be achieved by means of acquiring relevant practical skills, knowledge as well as attitudes, understanding and knowledge-related occupants in various sectors of economic and social life.

The objective of technical and vocational education is to bring about application-oriented talents that provide related technical theoretical knowledge and practical

abilities. Vocational education was more favoured than other careers, such as those in mechanics, mining, engineering and plumbing (Cong & Wang, 2012) as a form of both social and economic investment. “Vocational education is an efficient investment in young people as it provides skills for employability to reduce and enhance recovery in the spheres of affected economies to ensure sustainable socio-economic development” (UNESCO, 2012:1). Thus, most of the research from a global perspective define TVET as linked to developing skills and the necessary knowledge to generate employment, provision of social justice, increased productivity, promoting entrepreneurship (job creation), economic competitiveness, national and international development (Psacharopoulos, 1980; Akoojee, 2010; Arfo, 2015).

From the definitions and goals given above, it is clear that the TVET planners and policy makers in several countries have aligned their planning activities using the social demand approach, manpower-forecasting approach and the cost/benefit analysis model. Labour planning approach makes an analysis of the trained and skilled work force requirements to match the different sectors of the economy.

### **2.2.2 Understanding Technical Vocational Education and Training Colleges from a South African perspective**

In order to better contextualise the challenges in post-apartheid SA, TVET education provided with skilled lecturers, professional developmental opportunities and learner performance for socio-economic development, this study finds it necessary to give a brief overview of the historical background from a legal framework perspective. Linking to the highlighted global trends and interpretations in sub-section 2.2.1, the demand for skills is necessary for employment and socio-economic development, similarly created the demand for some form of TVET in SA. Many researchers in the SA context agree that one of the aims of introducing TVET in the post-apartheid era was that of addressing political, social and economic related forms of injustice and segregation in many respects, including skills development (Arfo, 2015). Arfo further identifies such forms of injustice and segregation emanating from the apartheid regime as related to racism, gender inequality, limited opportunities of enrolling into technical and vocational training institutions, designing technical and vocational curriculum, designing and implementing teacher/lecturer professional development strategies and allocation of resources in institutions of education in the field of technical and vocational training.

Such socio-economic imbalances in SA were associated with poverty, unemployment, economic depression and frustration among the black majority (Barnes, 2004; Badroodien, 2003). To confirm these views, Barnes (2004) mentions that during apartheid, non-Whites did not have the opportunity to acquire relevant industrial skills to secure employment. Furthermore, Badroodien (2003) points out that the quality and standards of educational training for black students were far below those in the white schools. To resolve the challenges, the literature analysis indicates that SA has undergone similar significant technical and vocational educational transformational processes (Wedekind, 2010; Wedekind & Watson, 2012).

In 2002, SA followed global trends by creating FET colleges currently known as TVET colleges. They offer NATED programmes, and NC (V), in terms of the FET Act 98 of 1998 (SAQA, 2014; DHET, 2010). Technical colleges, training centres and colleges of education were merged into 50 larger TVET colleges with the aim of combining smaller and weaker colleges into stronger institutions, which would attract large enrolments exposed to a wider range of programmes of learning. This move was also expected to strategise students' training to meet their social and economic demands in one way or the other (SAQA, 2014; DHET, 2010; Sheppard, 2012). The aim of establishing these TVET colleges was to make them a central feature of the skills shortages in industries, job creation for economic growth (SAQA, 2014; DHET, 2010).

Although criticism of the implementation challenges is evident (Barnes, 2004; Badroodien, 2003), the TVET colleges are expected to address the skills shortage in the country. The above literature analysis indicates that the social and economic challenges identified above because of the apartheid system had a bad impact on skills development on the part of the disadvantaged black majority (Munyao, 2015; Meyer, 2007). To address such challenges, the post-TVET legal framework was designed. Historically, technical college lecturers were not required to have a specific teaching qualification to be appointed as lecturers in TVET colleges (Mgijima, 2014). These lecturers, in the view of Mgijima (2014), were mostly appointed based on their technical know-how and their experience in the work place.

The main purpose of these colleges is to train young school leavers, providing them with the skills, knowledge and attitudes necessary for employment in the labour market (SAQA, 2014; DHET, 2010; Sheppard, 2012). The TVET colleges provide training for

the mid-level skills required to develop the SA economy, and tend to concentrate on occupations in the engineering and construction industries, tourism and business studies. According to the White Paper (DHET:2013), the post-school system is understood as comprising all education and training provision for the benefit of the students who managed to complete school, including those who failed to finish their schooling (SAQA, 2014; DHET, 2010; Sheppard, 2012).

Another key objective of TVET colleges was to improve the quality of teaching and learning to match local labour markets. In addition, emphasis is given to strengthening partnerships with employers, both at department and college level. Such partnerships will assist the colleges to locate opportunities for WIL to place students when they complete their studies, and to obtain regular workplace exposure for staff to keep them abreast of developments in the relevant industry. Employers should also be able to advise the college system and individual colleges on issues of curriculum, and experts from industry could teach at colleges on a part-time or occasional basis. SETAs have an important role to play in promoting and facilitating links between colleges and employers (DHET, 2013).

A curriculum that responds to local labour market needs or that responds to requests from SETAs, employers or government to meet specific development goals will result in a differentiated college system with various niche areas of specialisation. The current mix of programmes and qualifications offered at the TVET colleges is complex to administer, difficult for students and parents to understand, and often poorly quality-assured. The entire gamut of vocational programmes and qualifications will therefore be reviewed and rationalised. Both the DHET and the Department of Basic Education (DBE) should ideally lead the review, as both offer vocational programmes; it should also involve the colleges, employers and relevant unions (DHET, 2013).



### 2.2.2.1 Management of Technical Vocational Education and Training

Some authors such as Yukl (1999), Perloff (2004) and Hay and Hodgkinson (2006) seem to confuse the concept management and leadership struggling to decide whether they mean the same or not or whether they should be combined, or not. According to the perception of Harris, Santangelo and Hayward (2008), leadership and management are not the same. The same authors conceive that a leader not only motivates others to accept new goals and challenges but also acts as a visionary agent who challenges others to go beyond their comfort zones. In contrast, managers focus on the planning, coordination and organisational roles needed to achieve the leader's goals (Harris et al, 2008). Furthermore, Harris et al. (2008) says that an effective leader must be a good planner, organiser and coordinator. At the same time, a manager must be a good leader, planner, organiser, and controller. Toor and Ofori (2008:63) define "management" as "the process of controlling, supervising, application of skills, caretaking, and coping with prevailing circumstances". Management should provide support and direction to staff so that they perform their duties effectively and efficiently.

In the context of the SA legal framework, Section 16 A part 1 and 2 of the SA Schools Act (SASA) No.84 of 1996 (as amended) (Republic of SA, 1996) make it mandatory and the responsibility of principals of all public schools and colleges to effectively manage available resources. Managers should therefore plan, lead, control and organise the development of lecturers' skills within the TVET colleges.

In the SA context, Arfo (2015) and Munyao (2015) made a comprehensive study of the role and responsibilities of the structure pertaining to planning and organising skills development, leading and guiding skills development and controlling skills development programmes. Apart from the contributions these studies make in determining and examining the roles and responsibilities of the structures of the TVET management teams, there are still challenges identified in the same studies associated with skills development management in SA, particularly in the 21st century. Some of the challenges noted by Werner and De Simone (2009) include the increasing workforce diversity, competing in the global economy, eliminating the skills gap, then proceeding towards lifelong learning, facilitating organisational learning and unsatisfactory educational outcomes. "Women are rapidly increasing in the work force main stream and hence skill development opportunities should be provided to help prepare women for senior

positions” (Werner & De Simone, 2009:22). The aging workforce provides insights for managers to include younger workers in skills development programmes. These researchers, however, seem to forget that the stipulation of the policies does not guarantee that the implementers know or will accept the recommendations that have been outlined.

According to the stipulations of the Transformation Learning Theory (TLT) in subsection the lecturers consequently have a choice to accept what they think is appropriate and at the same time reject what is not appealing in their view, since they are the direct implementers of policies. All the structures of the TVET managing board, including the lecturers, should be involved in the policy making process to be effective implementers in compliance with the TLT. The researcher assumes that if they are not involved, the interpretations of policies and procedures become directives and stipulations that they cannot comply with. The implication based on this literature review indicates that the policy making process also determines the results of its implementation process (Newman, 2012; Swanson, 2010).

#### 2.2.2.2 South African Institute for Vocational and Continuing Education and Training

Since the DHET is facing challenges with the TVET sector, it has planned to establish an institute that will support TVET and community colleges and the skills development system known as the SAIVCET (DHET, 2013). The primary responsibilities of SAIVCET will include developing innovative curricula for TVET and community colleges, upgrading the technical knowledge and pedagogical skills of existing staff in TVET and community colleges and promoting the professionalisation of lecturers, instructors and trainers; providing a forum for experts to develop materials for TVET and community college programmes; advising the Minister on vocational and continuing education; initiating research on the TVET colleges, the community colleges and the college system as a whole; promoting dialogue, coordination and linkages between TVET and community colleges, and between these institutions and universities, SETAs, employers and workers. This is done to enhance coherence and articulation and monitoring and evaluating the TVET and community colleges (DHET, 2013).

The DHET further explains that “SAIVCET will be governed by an autonomous board of experts and stakeholders established by the Minister; board members will be drawn from

the DHET, TVET colleges, community colleges, SETAs, the business sector, trade unions, universities, NGOs and communities” (DHET, 2013:26). To this date, there have not been any reports of whether the DHET has appointed members or carried out any activities.

#### 2.2.2.3 Understanding National Certificate (Vocational) engineering curriculum implementation in the Technical Vocational Education and Training colleges

Engineering is highlighted as critical skills for SA. Linked to the theoretical perspectives (sub-section 2.2) of TVET colleges, Schulte, 2015, points out that the field of engineering that is comprised of electrical engineering, mechanical engineering and civil engineering is the key to social and economic impact globally and locally. There has always been a heated debate about which one influences the other, human developments or technological development concerning socio-economic development (SAIIE, 2015; Dastkhan & Owlia, 2011; Sperotto, 2015). No matter what the answer might be, some researchers have the consensus that engineering involves mathematical, scientific, economic and social applications (SAIIE, 2015; Dastkhan & Owlia, 2011; Sperotto, 2015). This is associated with practical knowledge to invent, effective skills to make designs, innovative strategies including constructing and research skills (SAIIE, 2015; Dastkhan & Owlia, 2011; Sperotto, 2015). They further raise the point that the aim is to improve structures, tools and machinery materials, systems, processes and solutions for industrial organisations and other businesses. The implication then is that human beings are supposed to be on the verge of continuous improvement by influencing technological changes, including the relevant skills and competencies. In other words, industrial engineering is seen to contribute much to increased productivity, including the quality of services, work life and living standards for socio-economic development and stability (SAIIE, 2015; Dastkhan & Owlia, 2011; Sperotto, 2015).

One of the reasons why the engineering curriculum was designed and introduced in TVET colleges, both internationally and nationally, is to try to solve some of the challenges that have been identified in consulted literature. TVET colleges tried to integrate engineering with science to improve student understanding of technology (Schutte, 2015). As much as this is considered a true perception, Schutte (2015) found

that apart from the new skills policy regulations and curriculum innovative policies, SA's engineering industry in terms of scarcity skills is ranked Number 8 on the list (DHET, 2013). In his research, Schutte (2015) found that in SA, major socio-economic changes have occurred since 1994, industrial engineers have been exposed to several unique challenges some of which are associated with, unemployment, racism, gender, competence of both graduates and lecturers, and income profiles.

It is also the opinion of the researcher that to effectively reflect perspectives on adult engineering education and training in TVET and the experiences of lecturers in the NC(V) engineering curriculum regarding their professional development, challenges and strengths pertaining to their teaching and learning practices is not an easy task. Although the study by Munyao (2015) in the SA context attempted to clarify important terms related to skills development, staff development as the main component of education seems to have been neglected as well as other important aspects that are to be discussed in this section. Not all writers are able to distinguish between the three concepts, education, training and development. They use these three words interchangeably depending on different audiences. Education refers to those human resources development activities directed at providing knowledge, skills, morals values, and understanding required in the normal course of life with the aim of improving the overall employee competence in a specified direction and beyond the job now held (Nadler, 1970; Erasmus, cited in Meyer, 2002).

Development is concerned with preparing employees so that they can move with the organisation as it develops, changes and grows (Meyer, 2012; Nadler, 1970). Although development is much broader in perspective (Erasmus & Van Dyk, cited in Meyer, 2012), this study is only limited to lecturers' skills development. In relation to this study, lecturers' skills development therefore entails any continuous learning done by lecturers to improve and maintain high levels of performance.

Unlike education, which is broader in context, training has a much narrower focus. Meyer (2012) defines training as the transfer of specific skills to employees so that they can perform a very specific job or task. This implies that training is task-orientated and focuses on specific skills aimed at improving performance. According to Meyer, (2012:5) "training is done after a needs analysis or after a gap has been identified in

performance-related areas". In relation to the performance of TVET college lecturers in SA, managers should identify gaps or conduct a needs analysis for lecturers and in turn train and boost lecturers' performances.

NCV has the following components which will be discussed to understand how these programmes are implemented. These components include, but are not limited to, the following: structure, students' enrolment entrance requirement, qualifications, subject content, ICASS & ISAT, results and certification and lecturer and student performance.

i) The structure of NC(V) engineering programmes

TVET colleges have four NCV engineering programmes namely civil engineering and building construction, electrical infrastructure construction, engineering and related design and mechatronics. For the purpose of this study only three programmes will be discussed as they are offered from the chosen college.

The structure for NC(V) engineering programmes on Levels 2, 3 and 4 is the combination of the following subjects:

(a) Three compulsory subjects

- Language: This must be one of the official SA languages and should be LOLT.
- Mathematics or Mathematical Literacy
- Life Orientation

(b) Four vocational subjects

These subjects are linked to a common vocational discipline, for example EIC. The subject combinations in each of the programmes provide a high degree of specialisation for an economic sector. It is important to note that of the vocational subjects, one subject may be chosen from any vocational programme to provide the student with either a higher level of specialisation, or the opportunity for broader training. The following list in table 2.2 includes elective subjects that can be chosen to have a complete combination of a programme of study:

**Table 2.1 List of NC(V) engineering programmes with subjects  
(DHET, 2011)**

Level 2	Level 3	Level 4
<b>CIVIL ENGINEERING AND BUILDING CONSTRUCTION</b>		
Construction Planning Plant and Equipment Materials Physical Science (O)* OR Carpentry and Roof Work (O)* OR Concrete Structures (O)* OR Masonry (O)* OR Roads (O)* OR Plumbing (O)*	Construction Planning Plant and Equipment Materials Physical Science (O)* OR Carpentry and Roof Work (O)* OR Concrete Structures (O)* OR Masonry (O)* OR Roads (O)* OR Plumbing (O)*	Construction Planning Construction Supervision Materials Physical Science (O)* OR Carpentry and Roof Work (O)* OR Concrete Structures (O)* OR Masonry (O)* OR Roads (O)* OR Plumbing (O)*
<b>ELECTRICAL INFRASTRUCTURE CONSTRUCTION</b>		
Electrical Principles and Practice Workshop Practice Electronic Control and Digital Electronics Electrical Systems and Construction (O)* OR Physical Science (O)*	Electrical Principles and Practice Electrical Workmanship Electronic Control and Digital Electronics Electrical Systems and Construction (O)* OR Physical Science (O)*	Electrical Principles and Practice Electrical Workmanship Electronic Control and Digital Electronics Electrical Systems and Construction (O)* OR Physical Science (O)*

<b>ENGINEERING AND RELATED DESIGN</b>		
Engineering Fundamentals Engineering Technology Engineering Systems Physical Science (O)* OR Fitting and Turning (O)* OR Automotive Repair & Maintenance (O)* OR Engineering Fabrication (O)* OR Welding (O)* OR Refrigeration Principles (O)*	Engineering Practice and Maintenance Materials Technology Engineering Graphics and Design Physical Science (O)* OR Fitting and Turning (O)* OR Automotive Repair & Maintenance (O)* OR Engineering Fabrication Boiler making (O)* OR Engineering Fabrication Sheet Metal Worker (O)* OR Welding (O)* OR Refrigeration Practice (O)*	Engineering Processes Professional Engineering Practice Applied Engineering Technology Physical Science (O)* OR Fitting and Turning (O)* OR Automotive Repair & Maintenance (O)* OR Engineering Fabrication Boiler making (O)* OR Engineering Fabrication Sheet Metal Worker (O)* OR Welding (O)* OR Refrigeration and Air Conditioning Processes (O)*
<b>MECHATRONICS</b>		
Introduction to Computers Electrotechnology Manual Manufacturing Mechatronic Systems (O)*	Stored Programme Systems Electrotechnology Machine Manufacturing Mechatronic Systems (O)*	Stored Programme Systems Electrotechnology Computer-integrated Manufacturing Mechatronic Systems (O)*
*(O) = optional subject		

According to table 2.1, generally, the first three vocational subjects listed for each programme are compulsory subjects, whereas the rest are from the pool of optional subjects.

EIC vocational is used next as an example for subject combination:

Compulsory

- English
- Life orientation
- Mathematics

Electives

- Electrical Principles and Practice
- Workshop Practice
- Electronic Control and Digital Electronics

Optional subjects (students choose one from the following)

- Electrical Systems and Construction (O)\* OR
- Physical Science (O)\*

ii) Students' enrolment

It has been observed over several years that NC(V) programmes' enrolment is increasing.

**Table 2.2 Total number of TVET colleges' student enrolment**

Qualification category	2010	2011	2012	2013	2014	2015	2016
NC (V)	130 039	124 658	140 575	154 960	166 433	165 459	177 261
Report 191 (N1-N6)	160 774	333 754	359 634	442 287	486 933	519 564	492 026
Occupational programmes	23 160	20 799	62 359	19 000	19 825	20 533	13 642
Other	35 420	32 062	95 132	23 371	29 182	32 424	22 468
Total	358 393	400 273	657 690	639 618	702 383	737 880	705 397

Table 2.2 shows the growth of the TVET colleges' enrolment since 2010. The number of students increased over the past seven years. The NC(V) programmes has grown gradually. It is evident that colleges are marketing their programmes very well.



### iii) Entrance requirements

The minimum entry requirement for NC(V) programme L2 was Grade 9 with a pass in Mathematics and Science subjects. However, students with Grades higher than Grade 9 are also accepted. This has led to a diverse classroom population, often creating challenges for the lecturers in managing both behaviour and curriculum implementation.

### iv) Qualifications

The international benchmark of an average population per engineer shows that SA lags behind other developing countries. According to Engineering Council of South Africa (ECSA) 2011 in SA, one engineer services 3166, compared to Brazil's 227 and Malaysia's 543. The discrepancy in the benchmark points to one thing: SA is severely under-engineered (ECSA 2011:1). NC(V) is a 3-year programme and it has the following engineering qualifications at NQF Level 2, 3, & 4: Electrical, Mechanical, Civil and Mechatronic

### v) Subject content

There are three compulsory subjects, namely Language, Mathematics/Mathematical Literacy and Life Orientation in the NC (V) curriculum. The study of language must include one of SA's official languages and should be offered as a language of learning and teaching (LOLT) (DHET, 2013; 2015). The NC(V) curriculum was promulgated after a relatively short development and consultation period in 2006 and was implemented in January 2007. At the same time, colleges were informed to phase out the old NATED subjects. In addition, the students specialise in one of a number of streams including Civil Engineering, Electrical Engineering, Mechatronics, Engineering, Marketing, Finance, Management, Office Administration, Tourism, Information Technology, Hospitality, and Agriculture, Safety in Society, and Education and Development (DHET, 2013; 2015). In this respect, one of the researchers (DHET, 2015) mentions that soft skills as a requirement of the engineering sector is viewed as proficiency in Mathematics, computation, reading, writing, the effective use of resources and information, interpersonal skills, an understanding of systems and the mastering of technology and flexibility in coping with change in the workplace as the new

competencies required by engineers in the current knowledge era. In other words, the inclusion of the three compulsory subjects is a noble idea to prepare the students for the vocational subjects. In addition to these compulsory TVET subjects there are four vocational subjects linked to common vocational disciplines, for example Electrical engineering (DHET, 2013; 2015). The subject combinations in each of the programmes provide a high degree of specialisation for a particular economic sector. It is important to note that of the vocational subjects, one subject may be chosen from any vocational programme to provide the student with either a higher level of specialisation, or the opportunity for broader training as illustrated in table 2.2.

As mentioned before, three vocational subjects listed for each programme are compulsory subjects, whereas the rest are from the pool of optional subjects as illustrated diagrammatically in table 2.2.

#### vi) Internal Continuous Assessment and Inter-Grated Summative Assessment Tasks

The NC(V) assessment is done in two areas of assessment, namely ICASS and ISAT. The ICASS is the assessment that is conducted by using tests, assignments, projects and examinations. The students receive an assessment plan at the beginning of the year so that they can prepare well for their assessment tasks throughout the year. The ISAT is the assessment of a practical component where students practice what they have learnt, for example wiring electricity, and it is done in the workshop. The ISAT marks contribute to the final mark of that year. The students use relevant resources to practice under the lecturer's supervision. At the end of the year, students write a final examination that is managed by the DHET and quality assured by Umalusi and on completion of each level, students receive a DHET certificate (DHET, 2015).

#### vii) Results and certification of NC (V) engineering L4 students

NC(V) students receive certificates for each level passed and completed. The researcher chose level four because it is an exit level, which can be used to pursue further education. Since the examination is managed by the DHET, they also release the results for final examination. Certificates are sent to the colleges after every

examination session (DHET, 2015). Table 2.3 indicates the certification results for national NC(V) L4 for engineering.

**Table 2.3: 2016 NCV L4 Results (DHET, 2018)**

PROGRAMME	PASS RATE
Civil Engineering and Building Construction	27.4
Education and Development	55.0
Electrical Infrastructure Construction	34.0
Engineering and Related Design	29.8
Finance	38.0
Hospitality	40.5
Information Technology and Computer Studies	22.3
Management	54.9
Marketing	37.8
Mechatronics	33.2
Office Administration	48.4
Primary Agriculture	41.5
Primary Health	56.3
Process Plant Operations	11.2
Safety In Society	47.9
Tourism	64.6
Transport and Logistics	41.7

Table 2.3 highlights both the progress of results and certification according to programmes. It also indicates that NC(V) engineering curriculum have challenges, which could include understanding content and other factors that affect teaching and learning. All engineering programmes obtained less than 40% pass rate, which makes it evident that students in the field of engineering are not progressing well.

Assuming that there is a link between results, certification of NC(V) engineering programme and engineering lecturers and student performance, the following section elaborates on the same perception in terms of the stipulations of The Sector Skills Plan of the ETDP SETA.

viii)      Lecturer and student performance

The Sector Skills Plan of the ETDP SETA (ETDP SETA, 2011:44) indicates that “Lecturers were not adequately prepared for the introduction of the NC(V) curriculum and this has influenced both their content knowledge and teaching and learning practices”. In accordance with Table 2.2 Mabale (2012) and Mokone (2011) state that there is a lower level of professional teaching qualifications of engineering lecturers, which is illustrated in the 2009 Annual Survey data and that this may account to some extent for the poor performance of students in the NC(V) engineering programmes. The TVET teaching and learning approach/model, examination and certification and assessment takes place by means of ICASS of the theory and an ISAT for practical application. Lecturers are not familiar with these processes as they are not professional lecturers, but they are mostly artisans.

“At the FET Roundtable, one of the key challenges identified by participants was the lack of quality of teaching and learning in TVET colleges” (Mokone, 2011:3). Moreover, out of 7978 students who enrolled for the NC(V) engineering programme in 2016, only 2243 completed their qualification (DHET, 2018:47). From the specific TVET college, one of its engineering campuses has been offering NC(V) Electrical Infrastructure and Construction (EIC) since 2007 but in 2015, levels 3 and 4 were cancelled resulting in a recorded high dropout rate of above 36% with only 65% of students completing their final exams. The NC(V) engineering programmes’ results are reflected in Table 2.4.

**Table 2.4: Examination results for NC(V) engineering programmes in public TVET colleges**

NC(V) engineering programme	Total registered	Total number wrote	Total number completed	Completion rate (%)
Civil engineering and building construction	1912	1703	466	27.4
Electrical Infrastructure Construction	3058	2846	967	34.0
Engineering and Related Design	3008	2720	810	29.8
Total	7978	7269	2243	30.4

Table 2.4 shows the high rate of students who do not complete the programme. It is also noted that the completion rate is between 25% and 35%, which is a concern for skills development. There is a concern as to how lecturers are coping with the execution of NC(V) engineering curriculum. This table present the most recent results available.

#### 2.2.2.4 Challenges facing Technical Vocational Education and Training colleges

Despite the importance of TVET colleges, several studies of the SA context identify several challenges and constraints which, directly or indirectly, affect many learning programmes, including the engineering department in TVET colleges. Several white papers and programmes have been put in place by the government to address these problems, but there is very limited evidence or literature on the effectiveness thereof. Most notable flaws of the approaches are shown in Table 2.5. Various researchers in SA acknowledge that the current profile of TVET college lecturers has numerous skills development challenges associated with the current curriculum innovations (Verster, 2011; Munyao, 2015; Meyer, 2007; Government Gazette, 2014; DHET, 2010). In the view of Verster (2011:7), the current profile and skills of TVET lecturers is “indeed a cause of concern” and has an impact on the management of skills development programmes. The TVET lecturers’ current skills and challenges according to Verster (2011:7) are indicated in Table 2.5.

**Table: 2.5: Current Profiles and challenges for TVET lecturers (Verster, 2011)**

<b>Current profile</b>	<b>Challenges</b>
Qualified Artisans (no teaching qualification or training experience)	Good work place experience but lack classroom management, pedagogy and administrative skills. Not adequately qualified to teach the theory component. Inability to transfer skills and knowledge between contexts.
Qualified lecturers with teaching qualification	A large number of young lecturers coming straight from Universities or Universities of Technology (no teaching qualification, little to no TVET college experience and no workplace experience.
Students who completed their N6 Report 191 qualification and/or obtained their National Diploma.	Current teacher qualifications (HDE, PGCE and NPDE) are inadequate to meet the requirements of public TVET colleges. Some lecturers with these qualifications do not have the vocational competence required by the sector.
People with workplace experience.	Lack of professionalism (conduct, ethical issues, familiarity with students, lack of personal discipline). High turnover of staff in this area.
A large number of qualified lecturers who are on the verge of retirement and who will be taking valuable institutional memory and critical knowledge and experience with them.	No teaching experience, qualifications or workplace experience.
Lecturers with an academic qualification with certain knowledge gaps within a particular subject field.	No teaching experience or qualifications.
Lecturers inadequately qualified to deliver occupational programmes (not qualified facilitator, assessors and moderators).	Colleges have insufficient mentors to pass on cultural capital of the sector. The system does not allow for succession planning.
Lecturers inadequately qualified for assessment requirements within the TVET college sector.	Appropriate time for lecturer development.

The information in table 2.5 is relevant to this study since it gives an overview of attempts to reflect challenges, which seem to be experienced even up to now. Although lack of relevant qualifications and experience of lecturers as the barriers to quality performance as tabulated in table 2.5, criticism of the findings in the context of this study is based on its failure to uproot the reasons, why there are such qualification gap between what is expected and what is available. Although table 2.5 seems to have contributed in terms of tracing the trends of TVET colleges' challenges especially in the engineering sector, the main weakness of the tabulated challenges is failure to establish the real source of the challenges and suggest practical implementation strategies for resolving those challenges.

An analysis of table 2.5 indicates that the direct victims (lecturers, college managers and students) of the identified challenges from lower levels seem to be neglected in the process of resolving the challenges. Critics of the prescriptive approaches to policy implementation, suggest that for lecturers to effectively execute their duties, they must be actively exposed and totally involved in their important roles as learning mediators, scholars, researchers, curriculum designers and interpreters, learning programmes designers, material developers, lifelong learners, managers, administrators, assessors, subject specialists, pastoral, community and citizenship developers as change agents (Badugela, 2012; Killen, 2007; Chisholm, 2000). By so doing, it is assumed that this will also give them an opportunity to accept and realise the benefits of being consulted in staff development strategies for skills development and attainment of improved knowledge.

#### i) Challenges associated with TVET curriculum content

Having briefly analysed some of the identified TVET challenges, the following section unpacks the TVET curriculum including its content and structure, strengths and more challenges in the SA context.

While it can be emulated that more students had access to colleges after matric, lecturers had to face the burden of overcrowded classes that were not easy to handle. This could be viewed as quantity compromising quality.

## ii) Discipline

Behaviours associated with a lack of discipline became rampant among some of the students in different colleges. Acts of misconduct related to drug abuse, pregnancies and absenteeism were common to such an extent that lecturers were frustrated.

## iii) Employers' attitude towards the TVET curriculum

As stated in sub-section 1.1 the phasing-out of N1-N3 was halted because already in 2010 NC(V) curriculum was not delivering what the industry needed. Certain employers and private service providers were seen starting to develop SETA-based occupational qualifications on a large scale (DHET, 2015). These qualifications were very job-specific and therefore very appealing to some employers (DHET, 2013). However, it was not long before thousands of qualifications were developed with no coordination. Both the proliferation of qualifications and the cost-effectiveness of provision became a major concern. Effective quality assurance was largely non-existent. Recently, Level 5 (Higher Certificate) programmes have been introduced in some colleges in partnership with universities. This has worked well in terms of developing and enhancing intermediate skills, which are in high demand. These programmes are often occupationally directed but have strong articulation possibilities into higher education, something that both the NATED and NC(V) engineering programmes largely failed to achieve (DHET, 2013; 2015).

To complicate matters further, there are technical high schools under the control of the DBE and provincial education departments that offer the National Senior Certificate (NSC) with technical subjects (DHET, 2013; 2015). Over 1 000 technical high schools in the country allow students access to artisan programmes such as apprenticeships. After a period of decline, the DBE has responded to calls to vocationalise the offerings in technical high schools with a recapitalisation programme for technical schools (DHET, 2013; 2015). These schools now again offer occupational subjects in increasingly well-equipped workshops (DHET, 2013; 2015). The current technical high school curriculum in fact has the same purpose as the NC(V) engineering curriculum, as they both provide a general vocational education aimed at Grade 10, 11 and 12 students. Given all these developments, we find ourselves today with five vocational qualification types NATED (or N) programmes; NC(V) engineering programmes; occupational programmes; Higher



Certificates; and the NSC with technical subjects. (Government Gazette, 2014; SAQA, 2014; DHET, 2010; Sheppard, 2012; Schutte, 2015; Barnes, 2004; Badroodien, 2003).

Based on the above views, Field (DHET, 2014) confirms that the current architecture of the SA TVET system poses a confusing mix of overlapping and competing programmes and qualifications and inadequately developed programmes. The same author recommends that the merging of upper secondary vocational programmes to two main tracks – school and work based track; meet the needs of adult students, develop second chance programmes; development of diplomas and certificates at post-matric level should be promoted; improve pathways from initial vocational to academic programmes. He also mentions that current TVET programmes are insufficiently responsive to current labour market. For that reason, he also recommends that workplace learning be mandatory for vocational programmes; co-ordinate vocational provision through strategic body; establish flexibility in a proportion of the curriculum that can be adapted by the training providers; invest in better data, especially on labour market outcomes.

iv) DHET (2015) links the following challenges to recommendations

a) **CHALLENGE:** Current architecture of the SA TVET system poses a confusing mix of overlapping and competing programmes and qualifications and inadequately developed programmes.

**RECOMMENDATIONS:** Merging of upper secondary vocational programmes to two main tracks - school and work-based track; meet the needs of adult students, develop second chance programmes; development of diplomas and certificates at post-matric level should be promoted; improve pathways from initial vocational to academic programmes.

b) **CHALLENGE:** Current TVET programmes are insufficiently responsive to current labour market.

**RECOMMENDATIONS:** Make workplace learning mandatory for vocational programme; co-ordinate vocational provision through strategic body; establish flexibility in a proportion of the curriculum that can be adapted by the training providers; invest in better data, especially on labour market outcomes.

- c) **CHALLENGE:** Inadequate skills and qualifications of lecturers and the need to improve professional preparations of college leaders.

**RECOMMENDATIONS:** Strengthen professional preparation of these lecturers with attention to balance between pedagogical skills and workplace experience. Also promote effective college leadership by ensuring more systematic training for prospective and current college leaders.

- d) **CHALLENGE:** TVET colleges currently offer limited support for students who experience academic difficulties, and this reflects insufficient incentives at colleges to encourage completion.

**RECOMMENDATIONS:** Provide support to ensure adequate levels of literacy and numeracy; ensure adequate incentives for completion for both institutions; underpin pathways of progression with high-quality career guidance.

Having discussed the literature linked to the challenges associated with the lecturers' skills development and TVET curriculum content, the following section discusses the theory that supports this study.

## **2.3 THEORETICAL FRAMEWORK**

To achieve the purpose of the research and discover the research problem, the theoretical framework will be discussed over the topic of experiences of NC(V) engineering curriculum lecturers at TVET colleges to help the researcher to define the goal of this research. Ngulube (2018) explain that a theory or theoretical framework could be described as well-developed, coherent explanation for an event. The theoretical framework consists of theories that seem to be interrelated. The importance of theory in research is to identify the starting point of the research problem and to establish the vision to which the problem is directed. It assists researchers to define the goal of the research problem. Two theoretical perspectives namely the TLT and the Constructivist learning theory underpin this study. The reasons for choosing these theories is because the study involves lecturers' experiences and this study is trying to make them share their experiences whilst reviewing how they teach with an aim of improving. These theories will also assist the lecturers to make good choices in improving their teaching and learning processes. The next section discusses the TLT.

### **2.3.1 Transformative Learning Theory**

The TLT of adult learning, which entirely focuses on the relationship of two important variables, namely autonomy and responsible thinking in the field of adult education (Mezirow, 1997; Choy, 2009) underpins this study. The theory is part of andragogy which takes into consideration the importance of realising the roles that adult students (lecturers and students) pursue as linked to their backgrounds, experience, maturity, expertise in making significant changes to the beneficiaries of the teaching and learning process (Knowles, 1989). Although there has been a lot of debatable issues about change as knowledge and behaviour, the proponents of TLT strongly hold to the notion that such highlighted attributes contribute to critical thinking/reflection on how one views the world, rational discourse which initiates transformation to explore world-views, and the ability to articulate ideas to the lecturer or students (Mezirow, 1997; Choy, 2009). In other words, Mezirow (1997) and Choy (2009) believe that it is difficult to prescribe and give teaching and learning directives to adults considering that they have acquired comprehensive levels of experience, concepts, value associations and feelings, beliefs and opinions that make them perceive their own life world.

In the process of teaching and learning, teachers determine their way of acting, which allows them to make choices as well as to reject what they feel unworthy or irrelevant in terms of curriculum procedures, ideas, policies or practices (Mezirow, 1997; Choy, 2009). In other words, they are committed to accept what is worthy and strive to transform unworthy practices to suit prevailing circumstances.

Wolf (2007:12) states that “Transformative teachers/learners are self-reflective as they use their experience when making innovative decisions”. He adds this is the reason why it is important to focus on reflection as stated on Chapter 1, sub-section 1.3 of the lecturer/practitioner for the improvement of own practices as well as principles related to good teaching and learning practices that may enhance student success rates. Mezirow (2003) as a critical reflection of assumptions that may occur either through group interaction or independently therefore explains TLT.

(Mezirow (1997) envisages the TLT as putting more emphasis on the freedom of how adults should communicate by granting them opportunity to participate and share ideas in a collegial manner that provokes critical reflection by way of not only being

empathetic but having good listening skills too. This drives willingness to search for common ground or a synthesis of different points of view (Mezirow, 1997; Choy, 2009). In the SA context, it is recommended that professional developmental strategies implemented should view lecturers as adult students who must gradually become responsible and autonomous for the improvement of their own teaching quality depending on their level of experience and expertise (Glickman, 1981; Ralph, 2002; Glickman, Gordon & Ross-Gordon, 2013; 2014). This is based on the belief that adults are dependent on self-directedness as they are internally motivated inquisitively to pursue the route of professional autonomy for quality performance (Knowles, 1989).

This theory is related to the constructivists that involves two kinds of learning namely instrumental and communication. Instrumental learning according to Mezirow (1994) is task-oriented whereby problem solving makes sense in determining relationships regarding cause/effect. The main purpose of such professional developmental strategies enables an adult learner to work independently and committedly to acquire new skills as suggested by the proponents of the self-directed supervision strategy (Glickman, 1985) and peer supervision strategy (Glatthorn, 1984).

Because of the nature and characteristic of the TLT, Mezirow (1994) describes it as being a constructivist learning theory an orientation that holds the way students interpret and reinterpret their sense of experience. This is central to making meaning and enhances learning. The constructive learning theory will be discussed in sub- section 2.3.2.

#### 2.3.1.1 The role of transformative learning in curriculum and professional development to the lecturer

Characteristics of transformative learning are associated with a situation whereby an educator/lecturer critically makes a thorough examination of the way they develop alternative perspectives of understanding curriculum practices (Taylor, 2007; Mezirow, 1997; Newman, 2012; Swanson, 2010). It is essential that fostering this critical examination becomes the role of curriculum and professional development (Taylor, 2007; Mezirow, 1997; Newman, 2012; Swanson, 2010). The role of professional development is to assist lecturers in gaining awareness of their habits of the mind regarding teaching and learning (Taylor, 2007; Mezirow, 1997; Newman, 2012;

Swanson, 2010). In other words, as this professional development process unfolds, lecturers critically examine the assumptions that underlie their practice, the consequences of their assumptions, and develop alternative perspectives on their curriculum practices (Taylor, 2007; Mezirow, 1997; Newman, 2012; Swanson, 2010). lecturers need education and professional development sessions that will help them to question, challenge and experience critical discussions on school and curriculum improvement. They also mentioned that transforming lecturers so that they see themselves as agents of social change could be a challenge within education. That is why the assumption in the context of this study is that there is need for effective strategies for transformative professional development. This is discussed in the following section.

#### 2.3.1.2 Strategies for transformative professional development and TVET curriculum development

Curriculum development is defined as a process that is well planned in a very systematic way with a well-structured progression that reflects a purposeful perception with the intention of creating initiative improvements in any system of education (Cattington & Limon, 2010). Many authors agree that whenever there is political, socio- economic changes and developments taking place national or internationally, school curricula are always affected (Thomas & Lleras, 2009). Not only is the school curriculum affected but professional development strategies and staff development strategies are also affected (Cattington, 2010; Cummins, 2009).

According to theorists of transformative learning, the only way to succeed with educational changes is to provide opportunities for educators/lecturers to practise the following strategies (Taylor, 2007; Mezirow, 1997; Newman, 2012; Swanson, 2010):

- Displaying critical reflection on curriculum development in education.
- Allowing them to provide enough guidance and directions associated with experience in teaching and learning by real-life examples in curriculum changes and developments.

- Involving them in case studies to provide them with opportunities to investigate educational assumptions, as well as the consequences of curriculum choices and decisions about actions plans. The use of case studies focuses on curriculum practices including both the philosophical and practical aspects of lecturers ' practices.
- Allowing them to explore a variety of teaching techniques. This can help lecturers to test and compare new concepts and practices using previous techniques. This testing and comparison move away from uncritically accepting new teaching methods.

According to CHE (CHE, 2013) Amendment Act (no. 39 of 2008), the Council on Higher Education (CHE) is responsible for quality assurance for higher education, and for the implementation of the Higher Education Qualifications Sub-Framework (HEQSF). The HEQSF, in turn, assigns to the CHE the responsibility to develop standards for all higher education qualifications. Although legal frameworks are necessary for regulating curriculum policies, analysis of the above stipulation is an indication that some decisions in the SA context are done in a hierarchical structure. Curriculum standards are set from above with minimum contribution by the implementers who know the areas that need attention and that may bring about reputable standards to address their findings of the challenges they experience. Document analysis, group process method, brainstorming force-field analysis nominal group techniques, search conferences, observation method, questionnaire and surveys are other important aspects of action plans that have been identified to foster curriculum development according to the TLT (Madziyire, 2002; Cattington, 2010). In addition, reflective activities, case studies and critical theory discussions are regarded effective ways of making a needs analysis that can be implemented making use of the lecturers in their different organisations in curriculum planning, designing and implementation (Cattington, 2010).

It is not the purpose of this study to explore the theoretical and practical analysis of the curriculum designing process, but to give an overview of the practical implication of the TLT in solving curriculum issues.

#### 2.3.1.3 The role of transformative learning on NC(V) qualifications and lecturers' competencies.

Many academics believe that lecturers are always on the verge of learning to keep abreast with new curriculum developments (Cattington, 2010). This is the reason why there is always a need to upgrade qualifications to keep up to date with rapid educational changes and development (Cattington, 2010). This is also the main area of focus of the TLT aimed at ensuring that qualifications match the competencies of the standards of the teaching programmes (Taylor, 2007; Mezirow, 1997; Newman, 2012; Swanson, 2010).

There is evidence that most TVET lecturers in SA have not been appointed based on specialisation as reflected by their qualifications (CHE, 2013). Instead of terminating the contracts of lecturers on the ground of under qualification, this study finds it wise to give a grace period for lecturers to upgrade their qualifications by funding them to register with accredited institutions while they apply the principles of adult learning theories such as the transformative learning perspective. According to Swanson (2010) in the study, entitled "Constructing a learning partnership in transformative teacher development" it was found that mentoring is another strategy for transformative learning. In order to ensure professional and organisational development, a supportive learning environment should be created to provide a conducive transformative learning relationship between the mentor and the mentee (Swanson, 2010).

#### 2.3.1.4 The role of transformative theory in management of TVET

Structurally, the management of TVET is composed of the principal of the college, three deputy principals (DP), portfolio managers and campus managers. The principal is the chief executive officer and oversees the implementation of policies and procedures. The deputy principals report to the principal and have departments they are responsible for, such as Academic Services, Corporate Services and the Chief Financial Officer (CFO). The CFO manages the finances and the supply chain, DP Corporate Services manages Human Resources, Further Education and Training Management Information Services (FETMIS) and Marketing and the DP Academic

Services manages the curriculum, quality assurance and student support services. The campus managers' report to the DP Academic Services. Campus management is composed of a campus manager as the head of the campus, heads of departments, senior lecturers, lecturers, administration staff and student bodies. The council is responsible for governing the college. Activities that need to be managed at campus level are teaching and learning, asset management, procurement and student support.

As previously highlighted in sub-section 2.2.2, Arfo (2015) and Munyao (2015) made a comprehensive study of the role and responsibilities of the above structure pertaining to planning skills development, organising skills development, leading and guiding skills development and controlling skills development programmes. There are still challenges identified in the same studies associated with skills development management in SA, particularly in this 21st century. As highlighted in the same sub-section, some of the challenges as noted by Werner and De Simone (2009) include the increasing workforce diversity, competing in the global economy, eliminating the skills gap, then proceed for lifelong learning, facilitating organisational learning and unsatisfactory educational outcomes. Inequities and disparities among ethnic and racial (Werner & DeSimone, 2009) gender and ethnic differences, prejudices, cultural insensitivity and language differences are also challenges that are facing SA skills development.

These researchers have, however, been criticised for entirely relying on the stipulation of the policies forgetting that the same policies do not guarantee that the implementers know or will accept them regardless how long the list of the recommendations are.

Studying the TVET environment in line with the TLT may be one of the best strategies assuming that there is a focus on reflection of the lecturer/practitioner for the improvement of own practices based on the assumption that when lecturers discover their strengths and shortcomings in a conducive teaching and learning environment, it might lead to change or improvement. This is also the reason why examining their level of participation and involvement in decision making, in the policy making process including the needs analysis process is important. Because of the nature and characteristic of the TLT, Mezirow (1994:222) describes it as being “a constructivist theory, an orientation that holds the way learners interpret and reinterpret their sense experience is central to making meaning and enhances learning”. The following section



explain the link between the TLT and the constructivist learning theory. The use of these two theories helped the researcher to understand better how lecturers teach and how reflection can lead to transformation. It also made us understand how students. It is through the theories the interview schedule was developed.

### **2.3.2 Constructivist learning theory**

The same way as TLT, the constructivist learning theory broadly covers a wide spectrum of current research that overlaps with cognitivism. According to this theory, each individual learner independently constructs knowledge according to his or her own context and builds new ideas and concepts. This is the reason why it is linked to the interpretivist perspective. The constructivist theory has its roots from Piaget, Vygotsky and Feuerstein, Ausubel as well as Dewey and Jerome Bruner (Wadsworth, 2004).

The theory is based on the perception that knowledge is not about memorising but about construction to make meaning. Pedagogic approaches based on constructivism provide the teacher/lecturer the opportunity not only to observe and assess but to also engage with the students while they are completing activities and posing questions to the students to promote reasoning. Constructivists view students as being active rather than passive, so they will be the centre of the learning, while the instructor takes on the role of an advisor and facilitator (Siegler, DeLoache & Eisenberg, 2003). Students are encouraged to explore on their own in order to acquire more knowledge and formation and develop metacognitive processes for judging, organising, evaluating, relating synthesising, examining and investigating (Swan, 2005). Students should be encouraged to be active rather than passive in their learning (Siegler et al., 2003; Wadsworth, 2004). Students are taught to plan and direct their own learning as much as possible, and lecturers act as mediators, facilitators or coaches. However, this contrasts with the traditional mode of teaching in some SA classrooms, where the emphasis has been on the teacher transmitting facts to students and expecting them to memorise information by rote learning.

Driscoll (2000) explains that constructivist theory asserts that knowledge can only exist within the human mind, and that it does not have to match any real-world reality. This implies that every human being can learn new things without any background for as

long as he/she have mind. When you look at musicians, some started singing without any music qualification, but they succeed. Some people get jobs they have no knowledge of but with training they learn the required skills to perform that job. Constructive theory is powerful in education as it promotes independency. Olusegun (2015) indicates that if we accept that constructivist theory is the best way to define learning, then it follows that in order to promote student learning it is necessary to create learning environments that directly expose the learner to the material being studied. Similarly, Tam (2000) states the following basic characteristics of constructivist learning environments, which he says, should be considered when implementing constructivist instructional strategies:

- 1) Knowledge will be shared between lecturers and students.
- 2) Lecturers and students will share authority.
- 3) The teacher's role is one of a facilitator or guides.
- 4) Learning groups will consist of small numbers of heterogeneous students.

These environments are conducive to learning. However, not all schools have to have all of these in one class. For instance, in some schools the number of schools going age from that community determines the number of students in class. If students do not have alternative schools, lecturers are compelled to have overcrowded classes. This then jeopardise the implementation of constructivist environment.

The implication from the discussions in the context of this study is the complimentary nature of the TLT and the constructivist theory. It is also apparent that the TLT and constructivist theory place the teacher/lecturer on the position of a change agent which is one of the best qualities of a 21<sup>st</sup> century teacher whose role is to transform the curriculum to keep abreast with ever changing socio-economic developments due to rapid technology developments.

## **2.4 KEY CONCEPTS**

The purpose of conceptual framework is to unpack these concepts and provide meaning for the reader. Msweli (2011) views conceptual framework as a structure that consists of blocks of concepts presented in a manner that shows the concepts are interrelated. According to Miles and Huberman (1994:18), a conceptual framework is a visual or written product, one that “explains, either graphically or in narrative form, the main things to be studied, the key factors, concepts, or variables and the presumed relationships among them”. In this section, the researcher will discuss the concepts of this research named as the role of TVET colleges, NC(V) engineering curriculum and professional development of TVET college lecturers. Discussion of concepts will help us understand how and where data should be collected and why it should be collected.

The conceptual framework addressed the important concepts by providing a clear understanding of how the problem was formulated. All the discussions were explored not only on the current global and local perspectives on adult education and training, but also the experiences of lecturers in the NC(V) engineering curriculum at TVET colleges with regard to their views on NC(V) engineering curriculum, their professional development, their challenges pertaining to their teaching and learning practice as aligned to NC(V) policy guidelines and procedures and teaching and learning.

### **2.4.1 National Certificate (Vocational)**

According to the DHET (2010), the current TVET sector curriculum innovation strategies were driven by the transformational wave of development, both socially and economically. This is the reason why, according to SAQA (2001), there was a need to change technical colleges to TVET colleges characterised by a new NC(V) curriculum. This curriculum was introduced as general vocational training with the inclusion of academically and vocationally biased subjects to suit the theoretical and practical needs of the industry. TVET colleges were introduced to a new curriculum with the following curriculum description, NC(V) level 2 to 4 qualifications replacing the old National Education Department's (NATED) N1 to N3 certificate programmes as listed by the SAQA. The duration of each of the three NC(V) levels (L2 to L4) is completed in no less than one year. In other words, it will take the average committed student three years to complete all three levels. On successful completion of the third year, registered as

SAQA level 4 qualification, students will complete seven subjects all of which have also to be taken on levels 2 and 3 (Government Gazette No. 28677, 2006). These changes according to DoE (2001) were to align technical education with the stipulated standards of the NQF. Such changes also came with financial demands in terms of government investments in several respects including curriculum development. Changes involved their own strengths and weaknesses as highlighted before.

#### **2.4.2 Curriculum implementation**

Studies in different educational systems agree that there are two categories grounding theories to curriculum development and implementation namely, the design theories and engineering theories. (Druzhinina, Belkova, Donchenko, Liu & Morozoval, 2018). The same writers point out that design theories address the basic organization of the curriculum plan linked to both philosophical as well as social and psychology theories. Engineering theories are associated with giving explanations and, descriptions that guide curriculum-development activities (Druzhinina et.al 2018). There are three basic types of curriculum design subject-cantered, learner-centered, and problem-centered design. Subject-centered curriculum design revolves around a subject matter or discipline, such as Mathematics, English or Sciences (Druzhinina et.al 2018 & Schweitzer, 2019). Curriculum implementation therefore refers to how the planned or officially designed course of study is translated by the teacher into syllabuses, schemes of work and lessons to be delivered to students.

The term curriculum implementation plays a big role in education and had been defined in different ways by different academic writers. Garba (2004) viewed curriculum implementation as the process of putting the curriculum into work for the achievement of the goals for which the curriculum is designed. Curriculum implementation process involves a planned system which assist the department of education in providing learners with knowledge or experiences by teachers/lecturers. Mezieobi (1993), conceptualized the term implementation simply as a process of putting an agreed plan, decision, proposal, idea or policy into effect. Hence curriculum implementation includes the provision of organized assistance to staff (teachers) to ensure that the newly developed curriculum and some powerful instructional strategies are actually delivered at the classroom level. This is evidence that teachers/lecturers are important in the design phase as they can contribute from their experiences in teaching that subject or course.

Ivowi (2004) concur and simply define that curriculum implementation as the translation of “theory into practice”, or “proposal into action”.

Wedekind & Mutereko (2016) state that in order for vocational or occupational programmes to be effective they need to remain responsive to a range of issues, including but not limited to the needs of employers, shifts in technology, and the needs of the students and society more broadly. Hence DHET had a need to implement a new curriculum to respond to the needs of the employers and skills shortage in the country which is NC(V) and this study focuses on engineering as a critical skill.

Curriculum implementation therefore means the execution of a well-planned range of activities of a subject, course or module refers to how the planned or officially designed course of study is translated by the teacher into syllabuses, scheme of works and lessons to be delivered. If teachers or lecturers who are the curriculum implementers do not participate in curriculum planning may the success of curriculum implementation.

### **2.4.3 Educational resources**

Resources are the tools that are used to achieve a specific task. Educational resources are different tools that are used to acquire knowledge, teaching and space that is available for teaching and learning. Educational resources support education activities that are freely accessible, openly licensed text, media and other digital assets, which is used for acquiring knowledge, teaching, sharing your knowledge, learning as well as for research purposes. It is something, which supports the education. Education resources refer to all human, material, non-material audio-visual school environment and community materials available in an academic environment to facilitate school administration and simplify the teaching learning process. They also include other important materials used in the school to make teaching very easy and learning more meaningful and understandable to the students. Education properties covers all those resources human and non-human, drawn or photographed, built physically or automatically operated, books and all forms of related materials used in teaching and learning process.

#### **2.4.4 Work-Integrated Learning**

WIL is term given to a well-planned programme where students learn by doing in the real working environment that is relevant to the qualification they have obtained. The institutions may initiate the WIL process or students can apply direct to the industries. Industries set requirements for students who want to do WIL. WIL forces students to be productive and to do real work that translates into social and economic values (Govender & Wait, 2017). TVET colleges have a requirement to place students in the industry for WIL purposes. DHET (2013) propose that SETAs, individual employers, educational institutions, SAIVCET and the DHET must cooperate to tackle challenges such as increasing access to workplaces for students in vocational and higher education, in the form of various of types of work-integrated learning. DHET further suggest improving and updating the industry knowledge and experience of lecturers by providing appropriate work-exposure opportunities for TVET lecturers. WIL projects have demonstrated increases in job knowledge and skills, and lead to an improvement of attitudes and behaviours towards work readiness (Govender & Wait, 2017:52). Students need to be prepared for working environment and WIL provide them with that opportunity to gain experience whilst learning.

#### **2.4.5 Professional development**

Education is changing to adapt and shape the world to the current trends. Lecturers as the drivers of education they require some form of learning new skills, knowledge and technology to produce students that are relevant to the world we live in. OECD (2009) states that professional development can be provided in many ways, ranging from the formal to the informal. It can be made available through external expertise in the form of courses, workshops or formal qualification programmes, through collaboration between schools or teachers across schools (e.g. observational visits to other schools or teacher networks) or within the schools in which teachers work.

Holliday (2008) defines staff development in the teaching/lecturing profession as comprising of a planned process whereby the effectiveness of the staff (lecturers) collectively and individually, is enhanced in response to new knowledge, new ideas and changing circumstances in order to improve directly or indirectly, the quality of the

students' development. Staff development is a term used to focus on those activities that make lecturers in TVET colleges easily accept and promote innovations (Heller, Daetler, Wong, Shinohara & Miratrix, 2012; Buczynski & Hansen, 2010). Consulted literature agrees that development is an active pursuit of ways of contributing to the growth of the institute by its staff (Yorke, 1997; Hammond, Wei, Andree, Richardson, & Orphanos, 2009). In the context of this study, staff development as a broad term consists of such terms as continuous education, on-the-job training, professional development, in-service education and training (INSET), human resource development, off the job training, professional education, professional training and professional support (Billing, 1982; Harris, 1999; Nadler, 1970; Heller et.al., 2012).

It is a common understanding that staff development programmes are set in compliance with the educational goals and policies of the country. This is the reason why most countries structure the education system in such a way that they have the standard control units responsible for the development and implementation of staff development policies and programmes at national level, provincial level, district level, cluster level and institutional level. The same hierarchical structures also include legal professional associations that also enhance the same staff development programmes and policies.

#### **2.4.6 Qualification**

It is a planned combination of exit-level Learning outcomes and Assessment Standards, which has a defined purpose and that is intended to provide a student with applied competence and a basis for further learning. This culminates in the formal recognition of learning achievement through the award of a formal certification (DoE 2006:22).

#### **2.4.7 Programme**

It is a planned combination of fundamental and vocational subjects leading to a qualification (DoE 2006:22).

### **2.5 CURRICULUM IMPLEMENTATION SUPPORT**

In this section, the definition of curriculum implementation has reflected a procedural activity whereby the teacher/lecturer adopts an officially designed curriculum policy

document or program of study by translating it into teachable plans, including skills, concepts, goals and objectives and lesson delivery methods and activities to students. Taking it from this view point, curriculum implementation support therefore denotes the backing and guidance that is supposed to be given to the lecturers in order to enhance their roles in the curriculum implementation process geared towards assisting students to advance and develop a collaborative and positive relationship with their curriculum content. Active learning will increase the focus and retention of the curriculum, resulting in an exciting learning environment. From these definitions, it comes evident that key role players in curriculum implementation are both the lecturers and the students.

This then give an impression that when it comes to curriculum support in matters related to the curriculum implementation process, lecturers need to be supported to be able to support their students. It is important to note that lecturers are at the forefront of the implementation and they have an opportunity to implement curriculum effectively if they are always provided with necessary support. There are several stakeholders who play a role in curriculum implementation however we will discuss the lecturer support as curriculum cannot be implemented without them and resources since teaching and learning cannot take places if there no resources.

### **2.5.1 Lecturers' curriculum implementation support strategies**

Several researchers have confirmed that curriculum innovations are never static as a result of global educational developments and changes taking place on a daily basis. This has also triggered in this study the realisation of the need to ensure that lecturers are provided with relevant and enough support move with wave of such changes and developments with the theoretical and practical perspectives geared towards supporting policy stipulations. By way of making reference to section 2.2.2.3 paragraph 3 of this study, professional development challenges pertaining to strengths teaching and learning practices was indicated not an easy task. This is the reason why this study considers professional development as one of the major aspect of lecturers' support strategies that must be included in the lecturers' curriculum support programs. This is taking into consideration the approval provided by Meyer (2012) and Nadler (1970) when they mention that development is concerned with preparing employees so that they can move with the organisation as it develops, changes and grows



The implementation of NCV curriculum introduced new ideas and approaches to education. The implementation of the NCV programmes brought changes in what is being taught and how lecturers teach the students. The focus is on making teaching more learner-centred, with a more problem-solving nature, and outcomes-based, requiring the students to apply knowledge thereby transforming curricula to be more responsive to the needs of commerce and industry. The NCV lecturers were transformed from teaching NATED programmes which did not require teaching skills but rather facilitation or technical skills.

A key factor according to Mata, (2012:512) on which the success of curriculum innovations depends is the in-servicing of teachers in the use of new approaches. Du Plessis (2005:96) concurs with other authors that training is a prerequisite for meaningful and successful implementation of change. Penh (2005), further maintains that teachers need on-going support and development and the type of training offered in most countries desperately needs to be transformed. NCV lecturers may implement the curriculum with ease if provided with opportunities to develop their teaching skills.

Gewer (2010:14) states that FET Colleges Act of 2006 shifted the powers of employment of educators to college councils. In this process, lecturers were given the option to remain within the college or be deployed to schools and through this process colleges lost many lecturers with expertise (around 36% in one case). Therefore, lecturers generally either have technical qualifications or pedagogical qualifications but it is not the norm for lecturers to have both. He further explains that the draft National Policy Framework for Lecturer Qualifications and Development outlines the minimum requirements related to lecturers' qualifications, which includes a basic academic qualification (NSC or NCV), a qualification at level 6 or 7 that is relevant to the subject matter they are teaching, a pedagogic qualification at level 5, and practical instructors must demonstrate Improving quality and expanding the further education and training college system to meet the need for an inclusive growth path Page 16 occupational competence by means of a recognised trade/technical qualification if they are teaching the practical component of vocational subjects of the NC(V). The framework expects current lecturers to upgrade their qualifications to meet the minimum requirements. These are onerous requirements, especially if one considers the current context. NCV lecturers who have not received formal teacher training might be facing challenges implementing the curriculum that they are not qualified to implement. These lecturers

have valuable knowledge of the skill they are teaching but do not have the skill of executing the curriculum that was designed to be implemented by qualified teachers.

Consulted literature indicates that there are no curriculum support programs designed for the lecturers to make sure the colleges are being proactive in creating links with industry, particularly to facilitating access to the workplace for students for a period of brief exposure in order to enhance their learning in the college (Gewer,2010:17). He further explains that colleges lack the capability and credibility to engage with industry on equal terms. It has also been discovered that employers on the other hand are reluctant to work with colleges and do not have faith in the college's ability to produce quality graduates. The lack of balance between qualification and skills lead to the confusion among lecturers as they need to understand their responsibilities to make links with industries. Without the necessary support on becoming qualified teachers who possess certain skills it will be difficult for lecturers to guide students towards industrial expectations. Lecturers need to link the curriculum and industry requirements hence it is important for them to do practical with relevant industries.

While on that note, it is also important to briefly mention the role of constructivist learning theory in the context of student curriculum support implementation strategy. In the context of this study, adoption of the principles of the constructivism theory during curriculum implementation is assumed an important student support strategy. Section2.3.2 has emphasized that pedagogic approaches based on constructivism provide the teacher/lecturer the opportunity not only to observe and assess but to also engage with the students while they are completing activities and posing questions to the students to promote reasoning. Constructivists view students as being active rather than passive during curriculum implementation, so they will be the Centre of the learning, while the instructor takes on the role of an advisor and facilitator (Siegler, DeLoache & Eisenberg, 2003). The following section further elaborates the above highlighted views.

The role of lecturers in curriculum implementation is autonomous. They are the ones to select and decide what to teach from the prescribed syllabus or curriculum and therefore their roles are undisputable. Thus, curriculum designers have to ensure that their best and ideal curriculum is implementable (Schweitzer,2019). This means that the needs of all affected stakeholders should be identified in order to make everything possible instead of just taking a decision without involving all the concerned parties. However, it

has been observed that improving the education system in developing countries has been regarded as a priority in order to promote long-term economic development. In some cases, the initiatives of the curricula are often placed on development of the curricula, while the details of how the curricula will be implemented at the educational institution level are often neglected. Due to this factor, most of the developing countries have not been succeeding in implementing the new curriculum (Rogan & Grayson, 2003:41-43).

According to Rogan and Grayson (2003), management of a curriculum, the implementation thereof and resources are interdependent. It is because the effective management of curriculum implementation depends on the availability, control and monitoring of human and physical resources. Bubb & Earley (2004: 39) indicate that these resources include students, staff members, supplies, timetables, textbooks, teaching aids, facilities and financial resources.

Physical resources play an important role because the nature and availability of these resources directly affect the lecturers and students' ability to engage in the effective teaching and learning process. These resources include but are not limited to the following: a) campus classrooms; b) offices; c) toilets; d) furniture; e) electricity; f) water; g) security; h) apparatus; i) laboratory or workshops or simulation areas; j) library; k) computer labs; and l) photocopying (Rogan & Grayson, 2003). The TVET colleges have the necessary resources, however, it will be important to know if the resources are still relevant to the type of curriculum that is implemented which is NCV.

## **2.6 CHAPTER SUMMARY AND IMPLICATIONS FOR EMPIRICAL STUDY**

This chapter investigated how lecturers' experiences influence the provision of NC(V) engineering curriculum at a TVET college. The chapter also defined the concepts used in this study to make the reader understand how the problem was formulated and why the study is being conducted. This was followed by highlighting the theoretical framework, specifically focusing on the influence of TLT in conjunction with the Constructivist Teaching and Learning Theory in the SA context. Lastly, the researcher briefly explained the contextual framework by discussing the global and national perspectives on development of TVET colleges before focusing on adult engineering education and training, particularly in the context of post school training.

The implication from the literature review is that, the current skills development strategies applied are failing to effectively develop the pedagogical content knowledge that matches with the expected quality of TVET college standards that produces students who can match industry expectations. On the other hand, it implies that application of the transformative learning approach gives an opportunity for lecturers to continuously improve their skills to catch up with new developments in curriculum changes and innovation. The implications for the design and data gathering plans are that one has a well-planned system of selection of participants and data collection procedures.

In the next chapter, the rationale for empirical study and the research methodology will be discussed.

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

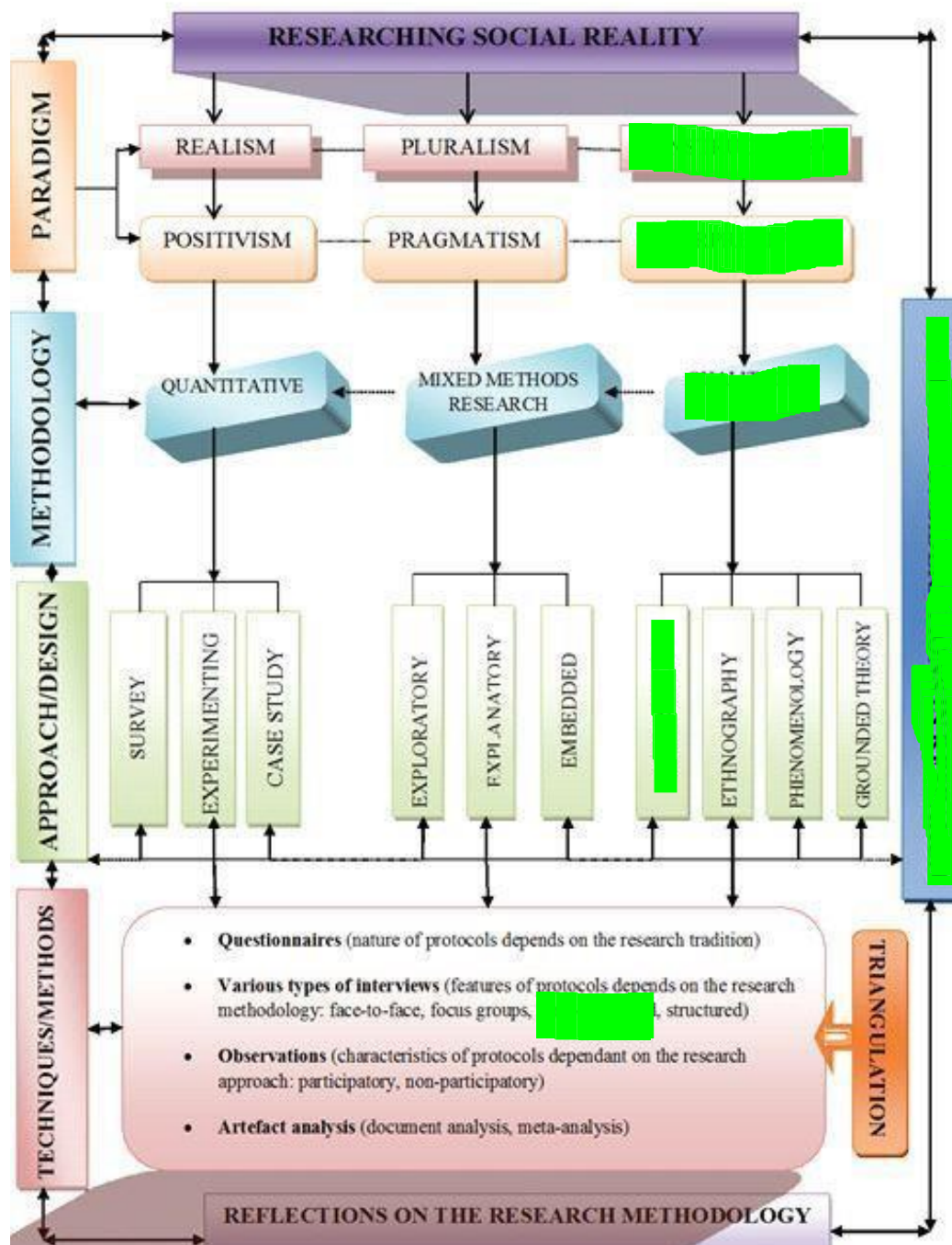
#### **3.1 INTRODUCTION**

The aim of this chapter is to discuss the rationale for empirical research, research design and research methods. Under research design, the researcher will discuss the research paradigm, research approach and research type. Under research methods, a discussion of the selection of participants, data collection and data analysis will be done to answer the main research question as stated in section 1.5. Ngulube (2018) explained the research process in Figure 3.1 that this study followed to make it easy to understand. Figure 3.1 assisted the researcher in constructing the research design and methods for this study. The researcher chose what was relevant to the study as highlighted because this is a general structure of how research methodology should be designed including the tools to be used in the collection of data.

#### **3.2 RATIONALE FOR EMPIRICAL RESEARCH**

The rationale for the empirical research is to determine the influence of the involvement of the TLT in conjunction with the constructivism theory to solve experienced challenges, enhance identified strengths and promote professional development opportunities and support provisions of lecturers in the NC(V) engineering curriculum in their teaching and learning practices in TVET colleges. Bhat (2019) define empirical research as any research where conclusions of the study is strictly drawn from concretely empirical evidence, and therefore “verifiable” evidence. The research was inspired by a high need of skills development, which could be successful, by effective implementation of theoretical and practical innovative strategies of eradicating challenges of poor capacity, scarce human resource development. engineering skills shortages of engineers in SA have posed as a threat to economic advancement initiatives. There is a need to gain knowledge and a deeper understanding by carrying out the study through qualitative research whereby data is collected by probing the lecturers’ lived experiences, opinions, perceptions, and views subjectively. Quantitative research limits the responses by way of being too objective.

Given the fact that the main purpose of the study was to get richer in-depth information to explore the research question by interviewing participants as a common research tool for qualitative methods. By means of using this research instrument, the researcher, also considered its subjective analysis and descriptive abilities including a high level of accuracy in exploring these feelings, experiences, and perception of the lecturers. The other reason was also based on the view that the interview approach suited this study since the selected lecturers commonly affected by lecturers' professional development challenges particularly in the implementation of the NC(V) curriculum in a TVET college. As highlighted before, from a philosophical point sub-section, constructive-interpretative provides an opportunity to collect and analyse data subjectively by conducting interviews. The constructive-interpretive paradigm is flexible to assist the researcher during interview sessions of lecturers to gain an understanding of their lived experiences.



**Figure 3.1: Mapping the research methodology discourse by Ngulube (2018:128)**

Figure 3.1 show that ethics is one of the overarching aspects of the research methodology landscape. Ethical standards and considerations should be upheld throughout the entire research process. Silverman (2000) reminds researchers that they should always remember that while they are doing their research, they are in actual fact entering the private spaces of their participants. Researchers should be ethical

at every stage of the research. Participants should be treated with respect from the time they are exposed to the researcher up to the data collection, analysis and dissemination of the findings. The research design or approach determines and controls data collection and analysis procedures. The methods and techniques used are highlighted in figure 3.1.

### **3.3 RESEARCH DESIGN**

According to Saunders, Lewis and Thornhill (2016:726) a research design is a “Framework for the collection and analysis of data to answer research question and meet research objectives providing reasoned justifications for choice of data sources, collection methods and analysis techniques” sub-section 1.5. A research design describes the procedures for conducting the study, including when, from whom, and under what conditions the data will be obtained (MacMillan & Schumacher, 2014:28). In other words, it provides the map from the underlying philosophical assumptions to research design, and data collection. De Vos, Strydom, Fouché and Delport (2011) concur by defining research design as the decisions the researcher takes in planning the study.

#### **3.3.1 Constructive-interpretative research paradigm**

Bakkabulindi, Mugagga, Shopi and Kabasiita (2015) explain research paradigm as a sort of ‘camp’, to which a researcher belongs in terms of assumptions, propositions, thinking and approach to research. In the context of research, a paradigm is a basic belief system and theoretical framework with assumptions about ontology, epistemology, methodology and methods (Rehman & Alharthi, 2016). In other words, the assumptions enable researchers understand the reality of the world (Richards, 2003). The constructive-interpretative paradigm was studied carefully and was found to be relevant to the study because it gives an opportunity to interview and interpret data. This paradigm is flexible and assisted the researcher during interviews with the participants to gain understanding of their experiences. At the end of the interviews, interpretation of data was done and followed guidelines to interpret the study academically.

The study used a constructive-interpretative research paradigm to pursue the purpose of



the investigation. This paradigm was chosen because of its ability to allow the research to obtain first-hand information about participant's subjective, but accurate accounts, of their views, feelings, perceptions and experiences as proposed by Cohen et al. (2007). Using the interpretative paradigm allowed the researcher to investigate and interpret participants' views regarding factors that affect their performance. On this score, Creswell (2007) emphasises that this is possible because the interpretative paradigm is flexible and adaptable. The researcher spent a considerable amount of time at the college campuses interviewing participants and making field notes. In addition, the interpretative paradigm further allowed the researcher to develop an in- depth understanding of specific factors that influence the lecturer's teaching and learning. In short, the paradigm assisted the researcher to gain of an in-depth understanding of the social phenomenon under investigation from the participants' point of view (Livesey, 2006). Consequently, the researcher engaged participants at their sites in order to elicit their understanding views, experiences, perceptions and attitudes regarding challenging factors experienced in the implementation of NC(V) engineering curriculum. Ultimately, the identified factors helped to provide solutions and recommendations to improve the performance of both lecturers and students.

### **3.3.2 Research approach**

There are two identified approaches in research, namely the inductive approach and the deductive approach. Saunders et al. (2016:726) defines a research approach to theoretical development as a "general term for inductive, deductive and abductive research approach". The deductive approach uses the quantitative methodology, the inductive approach mostly uses the qualitative methodology and abductive reasoning involves deciding what the most likely inference is that can be made from a set of observations.

As indicated in chapter one, sub-section 1.7.1.2, qualitative research is often associated with a philosophy of interpretation (Denzin & Lincoln, 2011). Interpretive research tries to give context to the subjective and socially constructed interpretations in order to convey a concept being studied (Denzin & Lincoln, 2011). In view of this, the reason why the qualitative approach was used it is because the problem under study is subjectively oriented when one explores the real experience and perceptions of lecturers' in the implementation of the NC(V) engineering curriculum in a selected TVET

college (Saunders et al., 2016). Walsham (1993) argues that in the interpretive tradition there are no 'correct' or 'incorrect' theories. Instead, they should be judged according to how 'interesting' they are to the researcher as well as those involved in the same areas. They attempt to derive their constructs from the field by an in-depth examination of the phenomenon of interest. The theory assisted the researcher in responding to the research question and construct recommendations. The constructive-interpretive paradigm provided flexibility and assisted the researcher during lecturers' interview sessions to gain insight into their experiences (Saunders et al., 2016). First-hand information is important through the subjective, as beliefs, emotions, expectations, and experiences cannot be evaluated objectively when dealing with a problem whereby perceptions of lecturers are needed.

This study used the inductive approach by enriching the TLT in the context the research problem. In that perspective, many qualitative researches begin with an inductive approach to build theory or to develop a richer theoretical perspective (Yin, 2014).

The researcher employed a qualitative research approach with an intention to understand the lecturers' experiences in TVET colleges. Maree (2007) explains that qualitative research is based on a naturalistic approach that seeks to understand phenomenon in context meaning real world settings and in general and the researcher did not attempt to manipulate the phenomenon of interest. Leedy and Ormord (2010) however, argue that qualitative studies do not allow the researcher to identify the cause-and-effect relationship meaning nor does it address the question of cause and effect. In this study, the researcher described, interpreted and evaluated the factors that affect lecturer performance of TVET lecturers. The aim was to understand the lecturers' experiences in TVET colleges. *Qualitative research* is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell, 2014).

The study employed a qualitative research approach with the intention to understand the lecturers' experiences in TVET colleges. Ramadikela (2012) asserts that through qualitative research, the researcher can explore the life worlds of participants.

The study was done using qualitative methodology. The aim was to understand the lecturers' experiences in TVET colleges. Qualitative research is an approach for

exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell, 2014).

### **3.3.3 Research type**

Qualitative research is associated with a variety of strategies, which include action research, case study research, ethnography, Grounded Theory, and narrative research. Yin (2014) further explains that a case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within the real-world context. According to Crowel, Cresswell, Robertson, Hubby, Avery and Sheikh (2011:2) “the case study approach is particularly useful to employ when there is a need to obtain an in-depth appreciation of an issue, event or phenomenon of interest, in its natural real- life context”. The case study assisted the researcher to understand the experiences of the lecturers, as they were involved in the study to provide and share information. Gillham (2000) defines a *case study* as an investigation to answer specific research questions that seek a range of different evidences from the case settings. Yin (2003) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly defined. Gustafsson (2017) states that because of different reasons the case study can be either single or multiple. Yin (2003) confirms that a case study can contain either a single study or multiple studies. It depends on the researcher on which case study to use. The researcher chose multiple case study because there is two setting where data will be collected. Yin (2003) explains that when the researcher chooses to do a multiple case study he is able to analyse the data within each situation and across different situations, unlike when a single study is chosen. Lacono, Brown and Holtham (2011:56) confirm that “a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not evident”. A TVET college with multiple campuses (case settings) was studied to understand the experiences of lecturers teaching NC(V) engineering curriculum in these campuses.

The case study method is preferred because of the following: it is flexible; it produces diverse research outcomes and supports all types of philosophical paradigms (Bent, 2006). A Case study emphasises detailed contextual analysis of an event, it is a very useful exploratory tool as it enables researchers to examine issues-simple or complex

with ease using all methods possible to attain reliable findings. Multiple case study was selected because the evidence that is generated is strong and reliable (Baxter & Jack, 2008).

In this research, a multiple case study design focused on the challenges, strengths and professional development opportunities that effect the teaching and learning practices of lecturers within the context of the NC(V) engineering curriculum at selected TVET college in Durban, KZN, SA.

### **3.4 RESEARCH METHODS**

Research methods in qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell, 2014). The choice of a research method was determined by the “underlying theoretical paradigm” the purpose of the research, and the research question (Sarantakos, 2013). Research questions determined the method that was used to understand the reality. Among other things, a good research question should be interesting, relevant and ethical (Green, 2008). The next section provides information on the selection of participants, the instruments used to gather data and the procedures used in analysing data.

#### **3.4.1 Selection of participants**

KZN has nine TVET colleges in urban and rural areas. Each college has multiple campuses that offer different programmes. A specific KZN college was chosen because it has three campuses that offer NC(V) engineering programmes. The researcher worked at the college’s engineering campus for four years as a campus manager. The campuses are situated in the Durban area at a radius of 5 km from one campus to the other.

**Table 3.1: List of public TVET colleges and campuses in KZN**

<b>College</b>	<b>Campuses</b>
Coastal	Durban, Swinton Road, Umlazi, Umlazi; BB, AS-Salaam, Ubuhle Bogu and Umbumbulu

Elangeni	Inanda,KwaDabeka,KwaMashu,Mpumalanga, Ndwedwe, Ntuzuma, Pinetown and Qadi
Esayidi	Clydesdale, Enyenyenzi, Gamalakhe, Gcinangempi, Kokstad, Nqumuza, Port Shepstone and Sizanani.
Majuba	Newcastle,Madadeni, IT & Business, Majuba Technology Centre, Newcastle Technology, Ekuseni Youth Centre, Ncome Prison, Newcastle Training Centre, Open Learning Unit, Waterval Prison, Westville Prison, Dundee
Mnambithi	Ezakheni E-Section, Ezakheni A-Section, Ladysmith, Estcourt
Mthashana	Babanago, Emandleni, Kwa-Qgikazi, Maputa,Vryheid, Nqutu
Thekwini	Asherville, Cato Manor, Centec, Melbourne, Springfield, Umbilo
Umfoloz	Esikhawini, Eshowe, Jininindomnyama, Mandeni, Nseleni, Richtek, Sikhanyisele, Sundumbili, Thubelihle, ZCBF
UMgungundlov	Edendale, Midlands, Msunduzi, Northdale and Plessislaer

Table 3.1 shows a list of KZN public TVET colleges and campuses. The sample college was drawn from this list.

The selection of participants was done purposively to gather data in order to respond to research questions. Purposive selection of participants is a non-probability selection method in which people or units are chosen for a particular purpose, where the researcher has knowledge of the population and its elements, because they possess certain characteristics that makes them informative about the topic of interest (in this case the TVET college sector and campuses) (Babbie, 2007; Leedy & Ormrod, 2010).

Three engineering campuses were purposely selected as they fit in the study, which required participants who were teaching the NC(V) engineering curriculum.

A sample can be defined as the group of subjects from whom data is collected; often representatives of a specific population. The researcher used purposive selection of participants. Burke and Larry (2011) argue that among other non-random selection of participants' techniques is a purposive selection of participants rank high because it targets a group that is seen to be well placed to respond to the question about the study. Simply stated, the researcher selects elements of the population because of some

defining characteristic that makes them the holders of the data needed for the study (Maree, 2012; Tongo, 2007).

In this multiple case study, a selection of 15 TVET college NC(V) engineering lecturers (including HODs and senior lecturers) from two campuses were interviewed individually. The participants were provided with the purpose of the research and given the criteria as lecturers who have taught NCV engineering curriculum for a minimum of three years. The researcher tried to balance equality among the race and gender representation and all these lecturers were teaching NC (V) engineering curriculum. The researcher attempted to maximise variation in terms of gender and race. The participants were selected because they were teaching NC(V) engineering subjects at the TVET college. The aim was not to generalise the findings but to gain insight in the experiences of the participants in this specific multiple case study.

**Table 3.2: Biographical data of participants from two campuses**

Participants	Campus A	Campus B
Lecturers	5	6
Senior lecturers	1	2
HOD	1	
Total number in each Campus	7	8

Table 3.2 represents the 15 participants from two campuses who took part in the data collection.

### **3.4.2 Data collection**

To answer the research questions data was collected and analysed. For data to be collected, certain instruments should be used which could be interviews, questionnaires, observations and documents. This section discusses how data was collected and what instruments were used. Data collection instruments should be accurate and systematic in conducting scientific research (Abawi, 2014). This was done to make sure that findings are not biased.

An extensive literature study and a document analysis aided the construction of semi-structured interview questions (see table 3.3 and Appendix E). “A semi-structured interview is an interview in which respondents are encouraged to set the agenda of the interview, but they never have full control of the setting due to the presence of the interviewer” (Scott & Usher, 1999:109). Creswell (2011:44) argues that, “although interviewers have little control over semi-structured interviews, they remain a means to obtain directives as to what interviewers know and have little knowledge about”. The researcher conducted a meeting with participants and set up the schedule of what the interview is about, when the interview will take place and how interviews will be conducted.

Data for the current study was collected through individual interviews to understand the experiences of the lecturers. Individual interviews are intensive, long and probing, which mainly use open-ended questions to obtain data on participants’ meanings (McMillan & Schumacher, 2014). In this research study, all the participants were exposed to the same individual interview at their workstations. Questions that define the line of enquiry were prepared prior to the interview while probing questions were developed based on each participant’s responses.

During the interview, the researcher asked additional information, where necessary, to clarify understanding. The interview questions were mainly open-ended, and closed-questions were mainly used for collecting demographic information and for the enhancement of the qualitative data (Zohrabi, 2013).

All individual interviews were recorded and transcribed. In addition to the recording, notes were taken during interviews to refine further questions where necessary and to record non-verbal gestures which might have useful meanings (Oltmann, 2016).

Table 3.2 indicates how the researcher made sure that she asked the correct questions. The topics from the literature and how they were used to formulate the questions for the individual interviews are listed in table 3.2.

**Table 3.2: Topics and questions for interview schedule**

Topics	Questions
Perceptions of the lecturers on theoretical and practical principles of NC(V) engineering curriculum implementation	1. Please explain the curriculum for your programme (content, and relevance to the level of the programme)
	2. Please explain the assessment procedures for your subject.
	3. What resources do you require to make this curriculum a success?
Challenges that lecturers encounter in the implementation of NC(V) engineering curriculum	4. How is the student attendance? Please support your answer
	5. What is the pass rate for this subject?
	6. What is the throughput rate for the programme
The support programmes that are available to the lecturers to assist them with engineering curriculum implementation.	7. What are the activities you are involved with, that are meant to develop your professionalism?
	8. Do you require more development that is professional?
	9. <i>What type of support do you require?</i>
TLT as a possible innovative strategy of resolving challenges associated with implementation of NC(V) engineering curriculum	10. <i>Does NC(V) engineering curriculum address the shortage of engineering skills in South Africa? Please support your answer?</i>

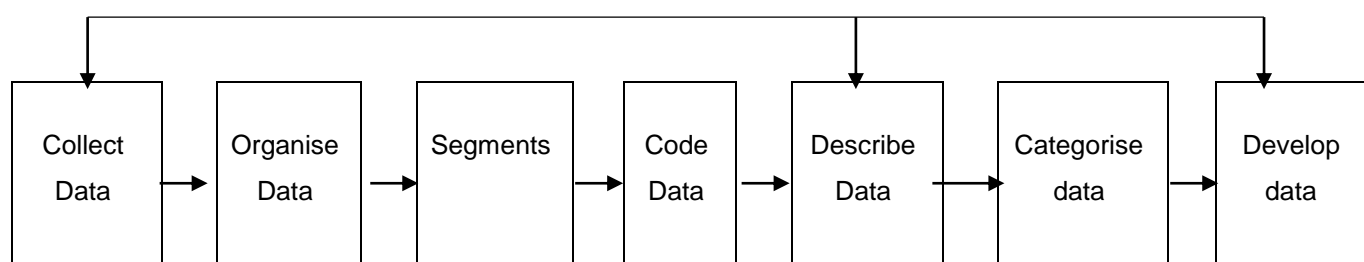
Table 3.2 illustrates how the research sub-questions were used to develop the interview schedule.

### 3.4.3 Data analysis

Data collected from this qualitative research was analysed by inductive analysis. Analysis was done during and after data collection as it is the norm in this kind of research. Inductive analysis was used to analyse data. This was done to establish more general themes and conclusions from collected data. Coding, categorisation, and data



interpretation was done to provide explanations of how NC(V) engineering curriculum is affecting lecturers in the engineering department. An interview study kind of data analysis is used in which the topics included in the questions asked are used to form categories that were divided into sub-categories. The steps illustrated in figure 3.2 by MacMillan and Schumacher (2014:397) were followed as a guide, as represented next:



**Figure 3.2: Steps in Analysing Qualitative Data (Adapted from: MacMillan & Schumacher, 2014:397)**

Qualitative Data Analysis (QDA) is the range of processes and procedures whereby we move from the qualitative data that have been collected, into some form of explanation, understanding or interpretation of the people and situations we are investigating (Sunday [sa]:19). Qualitative analysis was used because there was a story to tell from the results of the data collected.

The purpose of analysing data is to obtain usable and useful information. The analysis, irrespective of whether the data is qualitative or quantitative, describe and summarise the data. The researcher identified relationships between variables, compared variables and identified the difference between variables.

De Vos (2002) defines data analysis as the process of bringing order, structure and meaning to the mass of collected data. The data was organised, which involved data filing and putting it in a database as well as breaking larger units of data into smaller units followed by data transcription into segments, coding, description of data, categorising data and finally develop pattern according QDA. Data transcription is the process of taking the observation notes, interview recordings, visual images and other information and converting them into a format that facilitates analysis (MacMillan & Schumacher, 2014).

For this study, only individual interviews were used to collect data because the researcher needed to interact with participants to get rich data as individual interviews can have follow up questions and body language can be part of data collected to enhance the data. The next step was data coding, which began by identifying small pieces of data segments, that is, text that is comprehensible by themselves and contained one idea, episode, or piece of relevant information (McMillan & Schumacher, 2014). The codes that were used in the current research study were participants' perspectives, participants' thinking about people, strategy, process and setting (McMillan & Schumacher, 2010) which were constructed when interviews were transcribed. Statements that show how participants experience the phenomenon were then identified. Meaningful units were formed from these statements using verbatim language from the participants followed by grouping of the codes into entities that are called categories (McMillan & Schumacher, 2014). This led to patterns and relationships among categories being unearthed. From the relationships, meanings and deductions were made which lead to recommendations.

The inductive analysis was used to establish more general themes and conclusions from the collected data. For each topic the main ideas were selected as themes and from the responses the categories were created to fit under each theme. The coding, categorisation, and data interpretation aided in identifying the challenges, strengths and professional development opportunities that affect the teaching and learning practices of the lecturers in the NC(V) engineering curriculum at a selected TVET college. Atkins and Wallace (2012) explain data analysis as an ongoing process, which start with the immersion of data until you fully understand it. This assisted the researcher to understand the findings and was able to generate recommendations.

### **3.5 MEASURES FOR TRUSTWORTHINESS**

This study is a scientific, evidence-based inquiry and therefore has to adhere to notions of reliability and trustworthiness. Qualitative researchers consider that dependability, credibility, transferability and confirmability as trustworthiness criteria to ensure the rigour of qualitative findings (Schwandt, Lincoln & Guba, 2007). According to Seale (1999:2) "validity and reliability are largely discredited in the short history of qualitative research. That is the reason that dependability, credibility, transferability and confirmability were followed in ensuring that this study is trustworthy".

### **3.5.1 Credibility**

Macnee and McCabe (2008) define credibility as the confidence that can be placed in the truth of the research findings. “A qualitative researcher establishes rigour of the inquiry by adopting the following credibility strategies: prolonged and varied field experience, time sampling, reflexivity (field journal), triangulation, member checking, peer examination, interview technique, establishing authority of researcher and structural coherence” (Anney, 2014:276). Credibility in this study was ensured by purposeful selection of participants technique and by conducting individual interviews with the participants using the same set of questions. Questions for the interview schedule were guided by literature and the research questions. Member checks was done by providing feedback to the participants and asked their inputs where misrepresentation of data was noted. Academic mentor was assisting with checking tools and data collected and advised on the credibility of the report.

### **3.5.2 Transferability**

Transferability refers to the degree to which the results of qualitative research can be transferred to other contexts with other respondents – it is the interpretive equivalent of generalizability (Tobin & Begley, 2004). Transferability is the external validity, which ensures that the study can be transferred to another setting even if another researcher does it. Creswell (2003) maintains that to ensure external validity, a rich and detailed description should be provided so that anyone interested will have a solid framework for comparison. The researcher chose the purposive selection of participants and provided thorough descriptions since participants were from different settings (two campuses) and to ensure that the findings from the data could be transferred to other settings or groups.

### **3.5.3 Dependability**

Ntombela (2018) explains dependability as a fit between what is observed and recorded and what takes place in the natural setting. The researcher used a tape- recorder to keep evidence of the participants’ responses. A variety of participants were used because of their heterogenic and homogenic composition regarding differences in gender, race and positions held in one college but different campuses. The selected

college composes of staff from different races vis. blacks, Indians, coloureds and whites. No one was being excluded based on their differences so that if the study is repeated it produces the same results. Data will be saved on the hard drive where a password is used for access.

#### **3.5.4 Confirmability**

Shenton (2004:72) cautions that to ensure confirmability steps must be taken to help ensure as far as possible that the work's findings are the result of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher. Confirmability of the study was ensured through the participants' narrated responses of their lived experiences, perspectives and opinions within their natural setting. The above criteria were used to ensure trustworthiness on which the study can be evaluated on. Studies suggest that confirmability of qualitative inquiry is achieved through an audit trail, reflexive journal and triangulation (Bowen, 2009). The researcher carried a reflective journal during the study to keep records of everything that is related to the study. The same journal was used during data collection to note the surroundings of the research setting, which will help in assessing the researcher's influence in the research process.

### **3.6 ETHICAL MEASURES**

An application was submitted to the college as the researcher was requesting permission to conduct interviews to one college. DHET does not provide permission if one college is involved, hence authorisation was obtained from the chosen TVET college to interview the NC(V) engineering department's lecturers. An information letter was sent to all prospective participants to understand the purpose of the study and their role in it. Potential participants were requested to take part in the study. Informed consent was given to all participants who took part in the data collection phase. They were requested to sign the consent form and return it to the researcher at a specific time that was a week. Data was stored in a lockable cabinet and on a laptop with access/security codes to the documents. The qualitative nature of the research makes it more interactive. MacMillan and Schumacher (2014) outline the following ethical policy guidelines: consent, confidentiality, anonymity, privacy and caring.

These guidelines are explained next to fit in the study.

### **3.6.1 Informed consent**

All participant received information about the study and signed an informed consent, which was binding all participants and the researcher. The informed consent stated that participants could withdraw at any time without giving reasons.

### **3.6.2 Access and Acceptance**

To conduct the study, the researcher needed to gain access to the college and campuses. This did not pose a problem because the researcher has worked for the DHET and the chosen college as campus manager for the engineering campus.

### **3.6.3 Protection from harm**

Participants play a vital role in the study as the researcher used a multiple case study. It is for this reason that they were always protected from any harm. They were informed that if they felt uncomfortable they could withdraw from the study without giving any reasons.

### **3.6.4 Confidentiality**

Confidentiality was always ensured. No participant was unsafe to discuss matters during the interview.

### **3.6.5 Anonymity**

Participants' names were not disclosed throughout the process of writing this research. Their participation is confidential, and codes were used to identify participants.

### **3.6.6 Caring**

Lecturers as participants of this research were treated with respect and always protected. Interviews only took place on the agreed times and venues.

### **3.7 CHAPTER SUMMARY**

The chapter discussed the rationale for empirical research, research design and research methods. Under research design the focus was on the research paradigm, research approach and research type and under research methods the researcher discussed the selection of participants, data collection and data analysis in order to answer the main research question as stated in sub-section 1.5.

This chapter gave us direction on how the study was conducted. It also covered the tools that assisted the researcher to collect data, which was individual interviews. Participants were able to express themselves as they were assured anonymity and confidentiality. To ensure the trustworthiness of the study only the data collected by individual interviews was used as a narrative. All participants were given an opportunity to opt out of the study should they feel uncomfortable. The study concepts were discussed which would ensure that data collected were not harmful to anyone and in line with the research question. The next chapter will discuss the analyses of data that have been collected.

## **CHAPTER 4**

### **DATA ANALYSIS AND INTERPRETATION**

#### **4.1 INTRODUCTION**

This chapter answers the main question in Chapter 1 (sub-section 1.5), namely What are the lecturers' experiences in the implementation of the NC(V) engineering curriculum in a selected TVET college? In depth, knowledge of lecturers' experiences was obtained through literature review and the collection of data.

In Chapter 2, TLT (sub-section 2.3.1.1) was used as theoretical framework to assist lecturers to reflect on their experiences and change how they implement NC(V) engineering curriculum where necessary. Constructivist Learning Theory (sub-section 2.3.1.2) was also used to construct and make meaning of the information collected from participants as part of the theoretical framework. TLT and Constructivist Learning Theory assisted the researcher to understand the research problem because the experiences shared by participants revealed that they had no power or control or choices over what they are teaching but relied on what is prescribed which is not supported by these two theories. Interview questions were designed in such a way that the researcher can see the initiatives that lecturers take to improve the teaching and learning for the benefit of the programme. It was revealed that they rely on the department to make changes to the curriculum so that they can also attend to certain challenges they are facing.

Chapter 3 outlined the importance of the research methodology, process that were used in collection of data, the administration of the data collection instruments and how the data were analysed. The researcher used the process as in figure.3.1 choosing the most relevant procedure.

Data was collected using face-to-face individual interviews, from the lecturers (a HOD and senior lecturers included) who are teaching NC(V) engineering curriculum using a qualitative research approach. The empirical data was examined, which led to the development of themes of information and grouping of ideas and the researcher observed for patterns and repetitions of data. The researcher interpreted the patterns and interrelationships following a constructive-interpretative paradigm and constructed the categories from the patterns in the data, focusing on meanings attached to the patterns and interrelationships.

Against the background of the literature review (sub-section 2.2), and in terms of methodological choices made and motivated in sub-section 3.4, the views and opinions of the participants were collected, analysed, summarised, organised and presented.

This chapter reports on the research findings of the experiences by TVET lecturers in implementing the NC(V) engineering curriculum of the empirical investigation conducted to address the research question and the accompanying research sub-questions outlined in sub-sections 1.5.1 and 1.5.2.

## **4.2 THE RESEARCH PROCESS**

Data was collected using the face-to-face individual interviews. The total number of 15 participants, who are lecturing at different levels from two engineering campuses, were interviewed on their experiences in implementation NC(V) engineering curriculum. All lecturers who participated in the study were teaching the NC(V) engineering curriculum, which made the researcher to conclude that the research results were trustworthy.

An ethical clearance was obtained from UNISA's ethics committee. the college principal, specifically for the campuses that offer NC(V) engineering curriculum, granted permission to interview college staff. The researcher visited the identified three campuses and had a meeting with campus managers to discuss about the aims of the study and interviews. Thereafter campus managers arranged meetings with NC(V) engineering staff to explain to them the purpose of the interviews and request them to participate and fill in consent forms if they are willing to participate. The researcher went back to each campus to collect the consent forms as per agreement.

Out of three campuses, only staff members from two campuses returned the consent forms. For that reason, only two campuses participated in the research because by not returning the consent forms the researcher had to conclude that they were not willing to participate and that was accepted. Lecturers were on different levels grouped as lecturers, senior lecturers and a HOD. The researcher directly interviewed all the participants, making use of an interview schedule (Appendix E). All interviews were between 30 and 45 minutes for each participant. All interviews were audio recorded and notes were taken during interviews to enhance the understanding of experiences shared. During interviews, participants were asked follow-up questions where answers



were not clear or not sufficient. Questions were clarified where clarity was needed or if the response was not relevant to the question.

Besides the delay in meeting participants for scheduled interviews due to examinations and involvement in invigilation, no other challenges were experienced because all participants were very happy to get an opportunity to talk about their experiences. They expressed their happiness through sharing the information of how they were deprived the chance to raise their frustrations. Some even mentioned that even if there is no change but talking to someone who is there to listen and not judging was a relief for them. During the time of collecting data, the college students were writing the national examinations and lecturers were assigned to invigilate. That meant the researcher had to wait in between interviews for the next participant to finish with the students before we could start the interview. During the interviews, they mentioned that they were never afforded an opportunity to discuss their experiences concerning the implementation of the NC(V) engineering curriculum.

The researcher recorded all the conversations with the participants to ensure that results were credible. To use data collected, transcription was required. To ensure that data transcribed is true and authentic the researcher gave the audio-recorded interviews to the professional transcriber to transcribe all interviews. The transcriber prepared data from the recorded interviews. The researcher used field notes to make sure the coding was a true reflection of the interviews by comparing them with the transcribed notes. The field notes followed the same pattern as interview questions to make comparison manageable. The researcher checked responses for each participant from three sources, namely field notes, recorded interviews and transcribe notes. No discrepancies were found.

The research process followed the phases of thematic analysis as stated in Table 4.1.

**Table 4.1: Phases of Thematic Analysis (Braun & Clarke, 2006)**

<b>Phase</b>	<b>Description of the process</b>
1. Familiarising yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking in the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Phases of Thematic Analysis were designed by Braun and Clarke to assist researcher with data analysis procedures

### **4.3 DATA ANALYSIS**

The inductive method was used to interpret the participants' responses in the interview questions. Data was collected through individual interviews from lecturers, senior lecturers and one HoD. Data was organised and transcribed into segments. From transcribed data, similar responses were coded. Themes and categories were developed from coded data that emerged from similar responses.

Narrative analysis was used to analyse data. Sunday ([sa]) explains narratives as transcribed experiences. Every interview/observation has a narrative aspect. He adds that the researcher has to sort out and reflect up on them, enhance them and present them in a revised shape to the reader. The core activity in narrative analysis is to reformulate stories presented by people in different contexts, based on their different experiences (Sunday[sa]:28). This was done to assist the researcher to understand the participants' views and report on them accurately.

Research questions and overview of data gathered helped the reader to see the big picture and how things fit together – organise the presentation of findings around the specific research questions.

#### **4.3.1 Individual Interview data**

In this research, the 15 participants (refer to sub-section 3.4.1) were interviewed under the four preselected topics generated from the research questions and literature review (McMillan & Schumacher, 2010). The interviews were formulated to answer the main research question "What are the lecturers' experiences in the implementation of NC(V) engineering curriculum in the TVET college?"

The transcripts from the tape recorder were given codes for the reasons of anonymity and confidentiality. Participants from CA were coded as L1-L6 and from CB were coded as L7-L15 (cross reference to Chapter 3). The interview schedule reflected codes that were used by the researcher throughout the study. The participants' responses were used to illustrate and enrich the narrative.

In the interview schedule participants were asked these questions and their responses were summarised below. Annexure E provides the interview schedule and responses for each participant.

##### **4.3.1.1 NC(V) Curriculum**

*Please explain the curriculum for your programme (content and relevance to the level of the programme).*

Responses presented by participants revealed that they all have a clear understanding of their curriculum. This was evident as they managed to describe their curriculum and levels. Participant L2 who has taught NC (V) vocational subject for 12 years responded by saying,

*The curriculum of my subject is very relevant. If you take the students into consideration, it's too relevant to them too much information too soon in my opinion to answer your question truthfully the curriculum is a very good curriculum, but the only problem is that it does not match the students."*

Vocational subjects' lecturers complained about the high-level standard of the curriculum, which they matched it with the level of post matric qualifications. However, they were positive about the content of the programme if they can only enroll students who have passed senior certificate (Grade 12) with Mathematics and Science. Fundamental subjects' lecturers were happy about the content and the level of the programme.

#### 4.3.1.2 NC (V) Assessment

*Please explain the assessment procedures for your subject.*

The assessment procedures differed between the vocational and fundamental subjects. Participants agreed that vocational subjects and life orientation have practical and theory assessments. The theory assessments were conducted in the classroom and practical assessments were conducted in the workshops. The participants shared that their assessment plan comprises tests, assignments, orals, projects and examinations. However, some participants (3) complained about the weighting of assessments that has been reduced. Their concern was that students who do not qualify to pass, they pass because the weighting is too low. L8 raised the same issues:

*Ok ehh the style of the assessment is determined by DHET. Ok it has changed; I think it has changed because they are trying to improve the marks without addressing the problem. I am saying this because*

*if you look at ICASS, The ICASS of all vocational subjects has taken over the theory part.*

*If you look at the test Only 10% is taken from the test and only 25% is taken from the practical. The practical does not justify the actual knowledge because practical you can do certain things you can't do practicals in everything that has been taught. You do a practical for the specific component. You find that students achieve 80% on practical and 10% on theory part because practical is for a specific task whereas test is testing different topics. ICASS is mostly marks from practical whereas examination is theory and students fail because exams contribute more to the final mark. Students should pass both practical and theory because both methods contribute equally in the making of artisans.*

*Disadvantage: Practical does not assess all aspects of the curriculum.*

*Advantage: students get a chance to do both theory and practical assessments.”*

Participants commended the assessment plan as it is well organised with specific tasks to be done and relevant dates on when those tasks should be done. The other challenge raised was the number of assessments which they believe it is too much to be completed at the expected due dates.

#### 4.3.1.3 Professional Development

*What are the activities you are involved with, that are meant to develop your professionalism? Do you require more development that is professional? If yes, what kind of professional development do you need?*

All the participants have never attended any professional development, which is aimed at improving knowledge of the relevant subjects. Nevertheless, they all have attended the assessor and moderator courses organised by the college to improve their assessing

and moderating skills. They have also attended COLTECH training that is a system they use to capture marks. Four participants have developed themselves by studying National Professional Diploma in Education (NPDE) and Advanced Certificate in Education (ACE), which are teacher qualifications. They were compelled to study these qualifications because it is a requirement of the DHET. All participants who are teaching vocational subjects were complaining that they do not visit industries to sharpen their knowledge and skills to be in line with current industry expectations. L1 responded like follows:

*“Since I joined NC(V) I have attended only 1 workshop which was an introduction to NC(V) in 2007. Professional development is ongoing which helps to understand new developments and to adapt in the new technology. Our college is stuck in the number of hours we teach and not on the quality of teaching and learning. I have been working for this college for more than 20 years but have never been to industry to get exposure of what is happening there.”*

They believe that their non-exposure to the industry affects students because even though they pass the programme, they will not cope with the current technology that is used in the industry. WIL was presented as a major need for all vocational subjects' lecturers.

#### 4.3.1.4 Resources for teaching and learning

##### ***What resources do you require to make this curriculum a success? (Max 5)***

The main five resources that were mentioned were internet, 21<sup>st</sup> century workshop equipment, updated library, OHP cameras, whiteboard and eBooks.

##### ***Do you have relevant resources? Please explain***

All explained that the curriculum has most needed resources, for example well-equipped classes, books, workshops even though they have outdated equipment, but it is in line with the curriculum (which is also outdated).

##### ***What type of building structure do you require for your programme?***

All participants have relevant structures, which is workshops and classes.

***Do you have any prescribed books for the implementation of the curriculum? How do students access books? Are the books relevant to the curriculum? Please explain***

All participants have prescribed books. Lecturers from the list supplied by publishers and procured by the DHET choose books. All students get a book copy for each subject. Librarian distribute books at the beginning of the year and collect the books from students at the end of the year. Books are relevant to the subjects as subject specialist check the content before they request books.

Responses from L12:

***What resources do you require to make this curriculum a success? (Max 5)***

Classroom management software

***Do you have relevant resources? Please explain***

Yes, the majority

***What types of building structure do you require for implementation of the curriculum?***

Bigger computer lab

***Do you have prescribed books for the curriculum implementation?***

Yes

***How do students access books?***

Supplied

***Are the books relevant in the curriculum? Please explain***

Yes, content- guidelines

#### 4.3.1.5 Students' attendance

##### ***How is the student attendance? Please support your answer***

Response from L5:

*"Oh my God that is the drama with NC (V). The students' attendance for NC(V) by the time we get to term 2 which is June holidays it drops by 50% in term 2 and third term down to 42%. These figures are average and get worse as the year progresses."*

In summary, all participants were complaining about poor attendance. It was evident that poor attendance was affecting all programmes and all subjects. They stated that some of the reasons for poor attendance are as follows:

Students enroll for NC (V) engineering because they did not have any place to go and they were trying their luck with NC (V) instead of spending the whole year at home. Three Mathematics lecturers commented that students found the curriculum to be difficult, as they had no background in Mathematics. The fact that NFSAS do not pay transport money on time affect them, as some cannot afford transport. Students enrolled because of the transport provision from NFSAS.

Strikes that sometimes last a month demotivates students who were working hard towards understanding the content of these programmes.

The attendance rate ranges from 20% to 75% depending on the subjects and time of the year. Vocational subjects' attendance is very poor whereas fundamental subjects' attendance is better. At the beginning of the year the attendance is good, however, it drops from the second term due to the fact that students realise it is not just practical done at the workshop but there is theory, tests, assignments, projects and examinations. The low attendance is mostly for vocational subjects and higher attendance rates is for fundamental subjects.

#### 4.3.1.6 Students' Pass rate

##### ***What is the pass rate for this subject?***



The pass rate was a challenge for vocational subjects. Four subjects from one programme had a 0% pass rate for three consecutive years. Vocational subjects pass rate was very poor and fundamental subjects pass rate was very good except for Mathematics. Participants mentioned that students were struggling with Mathematics because they do not have basics from Grades 10 to 12. One male participant from CA mentioned that they enrol students who could not make it in basic education and it is difficult to make them understand Mathematics when they failed it from school. L10 response:

*The pass rate for my subject is around 20%. What I think needs to change is the syllabus to accommodate the students. If the entry requirement is not going to change, we definitely have to change the syllabus. Students have major problem with Maths. Maybe before they enroll for this course there should be a bridging course to get their Maths up to standard. Students struggle with calculation.*

NC (V) engineering programmes' pass rate is bad, and participants suggested the following for improvement:

Participants including one senior lecturer (five in total) believe that students should be motivated because extra classes do not help as they bunk normal classes. Relevant students should be offered appropriate curriculum and better assessment weighting as younger students get confused by the level of difficulty of engineering subjects. Past exam papers should be provided to students to help them prepare for exams. Lecturers should use social media platforms to assist students instead of using only the classroom for interaction. Assist students who have social issues. Syllabus needs to be changed and be brought down to the level of students. Mathematics should have a bridging course to teach basics of Mathematics to students. The DHET need to plan thoroughly, adopt relevant content knowledge, engage in research and review their work yearly.

One female participant from CB who has 80% pass rate was asked did achieve such good results, she did not have any tips to share but merely assumed that maybe students pass well because it is a language subject.

#### 4.3.1.7 Throughput rate

##### ***What is the throughput rate for the programme?***

The throughput rate for the engineering programme at campus A has been 0% since 2014 and for campus, B it is currently 12%. The reasons stated by participants are as follows: the curriculum is too difficult for students who have passed only Grade 9. Most students are dropouts from high school and cannot cope with tertiary studies. If relevant target group students who passed Grade 12 (with Mathematics and Science) were enrolled, the throughput rate will most probably improve. A change to the minimum requirement to a pass in Grade 12 with Mathematics will help. The curriculum should be linked to the industry needs. For L8 who has been teaching NC (V) vocational subjects has shared this information:

*The NC(V) throughput rate in our campus since we came here in 2007 is 0%. The students are battling with vocational subjects they are battling with mathematics, Maths being calculations. All Vocational subjects are those subjects that have intense calculations. Taking students that have Maths literacy means that this curriculum is doomed.*

**Table 4.2 Attendance pass and throughput rates for CA and CB**

	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15
Attendance	42%	20%	25%	20%	30%	40%	22%	80%	67%	30-40%	70%	60%	70%	70%	75%
Pass rate	20%	0%	35-50%	24%	80-85%	20%	25%	30%	24%	50-60%	40%	90%	90%	65%	20%
Throughput rate	0%	0%	0%	0%	0%	0%	0%	12%	%	2%	12%	30%	40%	50%	12%

Table 4.2 shows the attendance rate, pass rate and throughput rate for engineering programmes. The information was gathered from participants during interviews. It is noted that for L1-L6 they indicated a 0% throughput rate, which is alarming that there is a major problem with this curriculum. L2 responded with a 0% pass rate for his subject and L1-L6 have an attendance rate that is below 50%. These results showed that the situation is not good for CA as compared to CB. The statistics above have given the researcher the hope for this curriculum. If CB can do better than CA, it means that something can be done to improve CA and if that can be successful, CB as well can be improved for the betterment of the curriculum.

#### 4.3.1.8 Skills shortage

***Does NC (V) engineering curriculum address the shortage of engineering skills in South Africa? Please support your answer***

Out of 15 participants 13 agreed that NCV engineering curriculum could address the shortage of skills because it is a good programme. However, due to current challenges it is impossible to address the skills shortage. If the programme is implemented correctly, it will address the shortage of skills in the country. Response from L3:

*The curriculum can address shortage of skills in the country. If we enroll right students for the programmes. The student numbers are decreasing. The curriculum is good but we need to change our target market, which will be matriculants. We also need to adopt new technologies and match the industry needs.*

The challenge is that the right students do not register because they do not want to be with students who passed Grade 9 or they prefer university over college. The students with Grade 9 drop out from NC (V) when they realise the curriculum is too difficult. The target market is the problem and not the curriculum. Moreover, our curriculum needs to be in line with current technology. One male participant, however, stated that NC (V) cannot address the skills shortage in this country because it is not linked to the industry. He further explained that NC (V) students are not placed in industries on completion of their qualifications.

#### 4.3.1.9 Staff Support

##### ***What type of support do you require?***

All participants indicated that they need support to be able to form relationships with relevant industries. They will appreciate the change of programme requirements from Grade 9 to Grade 12 with Mathematics and Science. Participants also need computer laboratories with Wi-Fi so that students can do research and access online resources. The library needs to be upgraded with current resources. They would like the administrative work that lecturers are required to do to be reduced. They require ETDP SETA courses for development. Lastly, they would like to see improvement in terms of communication among all stakeholders.

##### ***Do you get support? If not, what could be done to ensure that you get the desired support?***

Participants (12 participants) mention that they are getting limited support in terms of the above-required support. The campus and college management provide support, but it does not reduce the challenges that are faced by NC (V) staff and students. The response from participant L7:

*We need support from DHET. There is a lot of papers that we have to deal with on daily basis. We are inundated with paperwork. There are so many things that we do besides teaching. They have added many things that are not teaching and learning. Some duties can be delegated to administration. For instance, exams, we have students who do not qualify to write we have to cancel them from the list just 4 days before the exams. We have to sit as a team and analyse who qualify and who does not. We have to do this analysis per student per subject, which is 7 subjects. For each subject cancelled you have to give a reason/s. reasons could be DP or attendance or both. That is extra work that we have to do. Maybe the DHET system cannot do that on time I do not know. However, if this can be done earlier so that we receive only the list of students who qualify, we will have less job to do.*

#### 4.3.1.10 General

##### ***What can you recommend for challenges that you are experiencing?***

According to 14 participants, the curriculum is good as it has theory and practical components. Entry requirements need to be adjusted. Students with Grade 12 who passed Mathematics and Science should be enrolled in the programme. Mathematics lecturers mentioned that Mathematics for NC(V) L2 is equivalent to Grade 12

Mathematics curriculum. Mixed grades should not be enrolled in the same class. The college should obtain funding for budget shortfalls so that workshops are equipped with relevant machinery and tools. The specialist should be employed to coordinate the engineering curriculum. The specialist should also monitor and evaluate the curriculum yearly so that recommendations are made for improvement to meet industry needs. L10 believes in changes:

*I would appreciate if they can change the course. Maybe reduce the duration to 18 months instead of 3 years. Enroll students that are post-matric so that they can make sense of this curriculum.*

The following section presents the themes and categories drawn from the empirical data.

#### **4.3.2 Themes and categories**

The data collected from the interviews was converted into scripts and coded by combining the answers of the participants into common themes or similar ideas that emerged. It was also proper for the researcher to analyse and interpret the themes. The interpretation of themes in relation to lecturers' experiences in implementing NC (V) engineering curriculum were tabulated in Table 4.3 that includes: curriculum, assessment, staff support, student support, skills development and changes. From the themes, similar patterns were identified and grouped as categories. It emerged from participants' responses under curriculum that they were discussing content, relevance of curriculum and level of curriculum versus students. In assessment, the responses were about types of assessments, which is theory and practical, and advantages and disadvantages were discussed. Regarding staff support, participants mentioned WIL

and resources. Student support was addressed attendance, pass rate and throughput rate. Another theme was skills development of which participants concentrated on implementation, level of difficulty for subjects and possibilities. The last theme was change that came up with requirements for the changes. Table 4.3 lists the themes and categories.

**Table 4.3 Themes and categories**

<b>Topics</b>	<b>Themes</b>	<b>Categories</b>
Perceptions of the lecturers on theoretical and practical principles of NC (V) engineering Implementation	The curriculum	Content
		Relevance
		Level of difficulty for subjects
	Subject assessment procedure.	Theory
		Practical
		Advantages
		Disadvantages
	The curriculum resources	Books
		Library
		Internet
		Technology machinery
Challenges that lecturers encounter in the implementation of NC (V) engineering curriculum	Student support	Students attendance
		Pass rate
		Throughput rate
	Skills shortage	The role of NC(V) engineering curriculum
The support programmes that are available to the lecturers to assist them with engineering curriculum implementation.	Skills development	Work-integrated Learning
		Possibilities
	Staff support	Resources
		Subject specific Training
TLT as a possible innovative strategy of resolving challenges associated with implementation of NC (V) engineering curriculum	Changes	Programme entry requirement
		Lecturers' suggestions

Table 4.3 illustrates how the themes and categories were constructed from the topics.

The discussion of themes and categories are as follows.

#### 4.3.2.1 Curriculum

##### i) Curriculum Content

Most participants understood their curriculum content. They mentioned the content they are using for NC (V) is irrelevant to the students' capability. They were even able to give examples of the parts of the curriculum that is from Grade 12 or from tertiary level.

##### ii) Relevance

All vocational subjects' lecturers were complaining that the curriculum is not relevant to students who are in possession of Grade 9 since its content was at a tertiary level. One even confessed that what he is teaching is the same curriculum as what he did at the university. However, they all agreed that the curriculum is good but not for the target group, namely students who passed Grade 9.

##### iii) Level of difficulty

All vocational subjects' lecturers agreed that the curriculum for their subjects was difficult for the target group. They contributed that the failure rate of these programmes is due to the level at which it is pitched, which is very high for students to understand.

iv) Curriculum is an important vehicle for education and it was significant to hear that participants understand their curriculum, which also gave hope for improvement.

#### 4.3.2.2 Assessment

Assessment is an important vehicle for education and it was significant to hear that participants understand the assessment procedure.

All participants shared a well-planned assessment. Vocational subjects have theory and practical assessment. Fundamental subjects have theory assessments except Life

Orientation, which involves a practical computer component.

i) Theory

All participants agreed that NC(V) theory assessment is called Internal Continuous Assessment (ICASS). ICASS for NC(V) programmes must have the following assessment activities per subject per year: fundamental subject must have seven activities and vocational subject must have five assessment activities. ICASS has the following types of assessments, tests, assignments, projects and internal examination papers.

ii) Practical

Participants described the practical assessment as the assessment that takes place in the workshops for vocational subjects. It is called the Internal Summative Assessment Task (ISAT). ISAT is done during the third term in September. Students practise what they have been taught in the workshop.

iii) Advantages

Most participants noted these advantages: They mentioned that it is an advantage for them that the assessment is provided to them and it includes due dates for the expected assessment. This leaves them with less work to plan the actual activities. One female participant mentioned the availability of the practical component as a rewarding activity as it is rewarding to see students with no engineering background demonstrate how tubing of electricity is done.

iv) Disadvantages

The disadvantage for the assessment plan was that this plan does not provide for remedial actions. However, participants have their own plans for students who are struggling. Another disadvantage is that groups of 20 students do practical tests/exams in the same workshop at the same time. This leaves the lecturer with little time to assist all of them. Since these students are not familiar with engineering world, they struggle with terminology and the labels of certain workshop equipment.



#### 4.3.2.3 Staff support

Staff support came out as a major concern for participants. It was clear that due to the lack of support, they end up struggling and try to find their way that sometimes does not work, and they get frustrated.

##### i) Resources

All lecturers of vocational subjects complained about the lack of resources or the fact that resources were outdated. Their main concern was that the field of engineering had evolved rapidly over the years, but they are still using equipment that was procured 10 years ago. They mentioned that with the ever-changing technology their workshops are no longer relevant to the current industry requirements. They therefore needed updated libraries, computer laboratories to be Wi-Fi connected to allow students to do research and watch online demonstrations of some parts of the curriculum.

##### ii) Subject specific training

All participants have never attended a workshop or training relevant to the technical subject that they teach. All participants have never been to workplaces in the industry to do Work-integrated Learning (WIL) as is required for skills programmes. One male participant who has been working for the college for 23 years but has never been upskilled in the current engineering developments. However, all of them have attended assessor and moderator courses organised by the college to develop their assessing and moderating skills.

Participants who were part of the staff component who implemented NC(V) engineering curriculum from year one only attended one training covering the implementation outline of the content, which was conducted in 2007. Those who joined the TVET college after 2007 have not been trained on how to implement NC(V) curriculum.

#### 4.3.2.4 Student support

Student support is one of the important components in education. All participants

experienced challenges with attendance, pass and throughput rate and this affected the whole curriculum implementation.

i) Attendance rate

All participants had a major problem with high level of dropouts. Some have above 50% dropout in one year. Most dropouts are from the level 2, which is the first year of NC(V) programmes. The attendance seems to drop after the first semester for most subjects. Some of the reasons is that, it is during these time students realise that they are not coping with the demands of the curriculum.

ii) Pass rate

The pass rate ranges from 0% to 90%. The subjects with lower pass rates are vocational subjects, which deal with engineering matters. The pass rate of 0% implies that there is a major crisis and it needs to be attended promptly.

iii) Throughput rate

The throughput rate for CA is 0% over about four years and for CB it was not clear as participants responded by stating “very low”. However, three mentioned that it was 12%. Other participants were not sure about the throughput rate

#### 4.3.2.5 Skills shortage

Engineering skills are a requirement for every developing country.

i) The role of NC(V) engineering curriculum

All participants believe that the NC(V) engineering curriculum can address the shortage of engineering skills in SA. The challenge is the target for these programmes, which is Grade 9. Either they change the minimum requirement from Grade 9 to Grade 12 or they design a curriculum that is relevant to students with Grade 9.

## ii) Possibilities

If the curriculum is implemented correctly, it will address the shortage of skills in SA. If relevant qualifying students register for NC(V) engineering programmes, they will be able to match the industry expectations. The update of workshops to current industry equipment will make it possible to address the shortage of skills in this country.

### 4.3.2.6 Skills development

To improve people's skills, they need to be developed to refresh their knowledge and stay updated. Participants were concerned they do not have contact with the industry and are given the opportunity to do WIL. They said WIL is part of their curriculum, as they need to teach students in preparation for work in the relevant industry. As the lecturers do not learn from the industry it means the industry might be reluctant to employ students who are produced by NC(V) engineering curriculum.

### 4.3.2.7 Changes

TLT advocates change. Participants raised some effects that require changes for better implementation of NC(V) engineering curriculum.

#### Programme entry requirement and suggestions

The main change that participants feel is urgent is the change of the engineering programmes' entry requirement. They need the requirement to change from Grade 9 to Grade 12 with Mathematics and Science. They strongly believe this change will bring major changes and address the challenges faced by the implementers of NC(V) engineering curriculum

Some of the responses from participants: The students with Grade 9 drop out from the college when they realise the curriculum is too difficult. The target market is the problem and not the curriculum. We are supposed to be enrolling students who have passed Grade 12. NC(V) engineering curriculum is more difficult than the curriculum for N6 that is a post matric qualification.

#### 4.3.2.8 Summary

It was evident that the NCV lecturers are experiencing problems with the implementation of the programme. What stand out from their challenges is the type of learners they enroll into the programmes. There is also lack of development to accommodate new changes in the engineering sector. However, there is hope that the programme can be implemented successfully should the issue of entry level for learners is changed to grade 12.

The next section provides the data interpretation of the study

### 4.4 DATA INTERPRETATION

According to Lebied (2018) data interpretation refers to the implementation of processes through which data is reviewed for the purpose of arriving at an informed conclusion. The interpretation of data assigns a meaning to the information analyzed and determines its signification and implications. The researcher discussed the themes, linked literature into the themes, and evidence resulting from the data during interviews. Each of the themes in Table 4.3 represents a possible way to approach the questions that were posed to participants during the interviews. These themes are not envisioned to be seen as commonly special or complete but instead complement or overlap one another. The transcriptions of the semi-structured interviews were clustered under the headings of the themes in Table 4.3.

From the data collected it was revealed that NC(V) engineering programmes' lecturers are facing challenges in implementing the curriculum. There was an outcry of the calibre of students enrolled for these programmes. The other concern was the absence of professional development which leaves the lecturers with ancient knowledge which is no longer relevant to the industry. Resources are a concern, but most basic resources are available. However, since the curriculum is old, so are the resources which are not relevant to the current industry need. Due to many challenges facing lecturers, they face the high drop-out rate and low pass rate.

#### **4.4.1 Curriculum: content, level and relevance**

Thirteen out of 15 participants agreed that the curriculum was good and relevant to the programme. However, they all raised a concern about the target group for this curriculum, which is students who has passed Grade 9. The challenge raised was that engineering needs Mathematics and Grade 9 has basic Mathematics and at that, level students do not choose Mathematics, but it comes as a compulsory subject. This pose a major problem for students, as they are required to learn Mathematics at a tertiary level when they lack Mathematics from Grades 10 to 12. Two participants disagreed as their responses made it clear that the curriculum is not relevant for the programme and industry.

This meant that what they are teaching does not cater for what the industry expects. It does not cater for changes that has happened over the years in the engineering field. This concur with research aims (sub-section 1.6) which emphasis exploring participants' views and challenges encountered when implementing NC(V) engineering curriculum. This section revealed how lecturers view NC(V) engineering curriculum. Participants were against the idea of enrolling students who have passes Grade 9.

This is contradicting the literature as it was mentioned that engineering lecturers were not suitable for teaching the engineering curriculum in the TVET.

#### **4.4.2 Subject assessment procedure: Theory, practical, advantages and disadvantages**

The assessment differs per subject. All participants were clear about the assessment plan and how to execute it. Tasks were between five and seven depending on the type of subject. Assessment has its advantages and disadvantages. Some participants mentioned that it helps them to check the students' understanding, provide remedial, plan for re-teaching. Assessment helps students to gain year mark. Four participants believed there are no advantages with the current assessment. All participants raised the same disadvantage, which is assessing wrong target does not help students to achieve. They raise issues like there is too much work and limited time, too much marking, low weighting of assessments defeats the purpose of assessment as students

pass even with very low marks. This confirms what Mokone (2011) revealed as poor quality in TVET teaching and learning (sub-section 1.2)

The procedure confirms the results of the literature which showed that NC(V) curriculum have a well-planned assessment procedure. However, on the other side the data collected revealed that lecturers are not happy about the weighting and several assessments that has to be conducted during the short period of time.

#### **4.4.3 The curriculum resources: Books, library, internet and technology machinery**

The participants shared the same views concerning books and they are in control of which books to use for that year. It was respectable that all students had access to books. The library was presented as a white elephant with old books. The internet and technology for engineering programmes is critical however, the lecturers and students are lacking the relevant information and tools to match current technology as stated by DHET (2015) sub-section 2.2.2.3. Even though books are available to students but if they have no access to current technology which is mostly used for engineering, students will remain outdated as far as industry knowledge and information is concerned.

From the literature it was revealed that the TVET colleges do not have enough resources, however data shows that there are resources but not relevant to engineering technology.

#### **4.4.4 Student support: Students attendance rate, pass rate and throughput rate**

All participants for vocational subjects have raised a concern of very low attendance and pass rate. The attendance and pass rate were better for fundamental subjects. The reasons from participants for very low attendance and pass rate was mainly the difficultness of the engineering subjects. They mentioned that the calibre of students they enroll does not match the level of difficulty for the subjects. This has led to very low throughput for the entire engineering programme. One programme has had a 0%

throughput rate for the past four years. This information concurs with table 2.4 sub-section 2.2.2.3 which shows that in 2018 the highest completion rate for NC(V) engineering programmes was 34%. This is shocking as education has a budget that is allocated to address the shortage of skills in SA, especially engineering. Since NC(V) engineering curriculum have existed for the past eleven years it is noted that some changes need to be done so that TVET colleges can produce artisans as planned and expected. Even though participants who were teaching fundamental subjects are doing well, the throughput rate cannot improve unless students also perform better in vocational subjects.

According to the literature students are supported by means of funding but data revealed that sometimes the processing of funding is too slow and affect the students' attendance. With regards to students' attendance rate, pass rate and throughput rate data confirmed what the literature presented which says the rates are very low.

#### **4.4.5 Skills shortage: The role of NC(V) engineering curriculum**

According to most participants (13), the NC(V) engineering curriculum is well designed and it can assist the country in addressing skills shortage. The challenge is how it is implemented and its target group. There is a possibility of a positive outcome if these engineering programmes only allows students who passed Grade 12 and with Mathematics and Science as subjects. The issue of skills shortage is a major concern for SA hence, it requires a successful plan to produce these skills. Looking at what participants has been commenting about the target group cannot contribute to the skills development of this country, it becomes a contradiction as to how the same curriculum can address the skills shortage as discussed in sub-section 1.1.

It came as a surprise that the participants believe that the NC(V) engineering curriculum can address the shortage of skills for the as oppose to challenging the curriculum, assessment procedures and professional development. However, with their recommendations the researcher had to consider their contributions.

#### **4.4.6 Skills development: Work-integrated Learning (WIL)**

WIL is one the critical component of skills development. Anyone involved in skills

development have an obligation to visit the industry that use the skills relevant to their development. The participants are aware that they should visit and work in the industry to learn new skills used in the real world of work. However, the college has no plan of executing this crucial activity. This raises a concern of the type of skills they are transferring to the students. One of the programmes involves computer technology - a field that changes rapidly. If lecturers are not exposed to current technology and continue presenting courses in the same vein they have been doing it for about 10 years, the programme might be a waste of time and money for both the DHET and the students. Skills development for teachers and lecturers is crucial for adapting to changes education sector introduce continuously as stated in sub-section 2.4.7.

The participants concurred with literature as they felt strongly that the absence of WIL affect engineering and result in teaching outdated curriculum.

#### **4.4.7 Staff Support: Resources and subject specific training**

Most staff complained about the lack of support. A major concern was the fact that they were not given a chance to visit industry so that they can learn new ways of doing things. Technology is ever changing and so is the engineering world. If lecturers are not familiar with what the industry is doing, it poses a major concern about the learning they are facilitating. The question could be posed: "What is the relevancy of what they teach and what is expected by the industry?" It was also noted that most resources are available for lecturers to use, but some crucial resources are still not in place. These include the computer, internet, smartboards and new equipment for workshops that are currently used in the industry workplace and accommodate new technology. For education to meet its goals, lecturers should be provided with the correct and effective resources. Lack of key resources jeopardise the quality of education. This responded to the objective which was seeking information regarding the support programmes available to lecturers to be able to implement the curriculum successfully.

Literature exposed that NC(V) engineering programmes' lecturers had a training when the curriculum was implemented, and the participants also raised the same concern. The concern also evident from participants who were not part of that initial training which means they have never received any training for the curriculum of their subjects.



#### **4.4.8 Changes: Programme entry requirements and lecturer suggestions**

Some participants who only teach fundamental subjects do not require any changes. However, all participants teaching vocational subjects need changes to the curriculum. The first important change is to enroll only students who are in possession of Grade 12 with Mathematics and Science. They believe it will be much easier to motivate them even if they feel like the subjects are difficult. Secondly, they need the visit to the industries to be part of professional development. They feel it is important to upskill themselves so that they can produce the relevant product that is relevant to industry expectation. One participant mentioned that industries use technology for the 21<sup>st</sup> century and they are still using old machinery to teach practical, this can cause more frustration for students who graduate with NC(V) engineering qualifications because the industry can be reluctant to employ someone who still need to be trained on new technology if others come well prepared for the same job.

#### **4.5 CHAPTER SUMMARY**

This chapter discussed findings and the analysis of the data, based on the problem statement, research questions reflected in Chapter 1 and the literature review as presented in Chapter 2. Data collected from the individual interviews confirmed that participants have different experiences in implementing NC(V) engineering curriculum. They are experiencing challenges that they need to be addressed urgently as they are demotivated by the throughput rate and pass rate. Even though they are experiencing challenges, but they try to use available resources to improve these programmes. Furthermore, they raised issues that need to be changed so that they can have a good product, which is mainly changing the requirements to enroll students in the NC(V) engineering programmes. They all agreed that NC(V) is a good curriculum that, if implemented to the relevant students can address the shortage of engineering skills in SA.

The data gathered by the interviews were written up, described and interpreted. It was discovered that most participants are experiencing challenges in implementing NC(V) engineering curriculum. The main challenge was to teach Grade 9 students without a background in Mathematics and Physical Science the NC(V) curriculum, which is pitched at a very high level. The resources were not a major issue, but participants

needed the current workshop equipment to be improved to match the needs of the new industry. The other major issue was the lack of professional development, as they need to be updated with the changes in the field of engineering. All the participants have never been to the industry for WIL ever since they started working in NC(V) engineering programmes. This is a major shortcoming since students should be trained to work in the industry in future.

Since participants were not developed to gain new information or skills related to their subjects, they felt the curriculum is not reviewed to accommodate new changes in the market.

#### **4.6 CONCLUDING REMARKS**

In the researcher's view, most challenges experienced by participants emanate from the type of students that are enrolled in NC(V) engineering programmes. Even though staff work hard to assist the students, they get demotivated when their students do not complete the programme or fail their subjects. The data revealed that the NC(V) engineering programmes' failure rate is too high. This is disturbing considering the resources and time invested in these programmes. Participants, at some point, felt the challenges they are facing cannot be resolved within the campus or the college. Instead, the DHET should review the curriculum and involve campus management and lecturers when making plans.

In Chapter 5 the findings will be summarised, conclusions will be made, and some useful recommendations will be shared to alleviate some of the challenges that are hindering the implementation of NC(V) engineering curriculum at a TVET college.

## **CHAPTER 5**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 INTRODUCTION**

The DHET, which was then (2006) the DoE, implemented NC(V) engineering curriculum to phase out NATED programmes to provide skills that are more relevant to the students. Infrastructure was upgraded to accommodate the new curriculum. TVET colleges were given independency to manage themselves with the assistance from the councils, which was appointed by the minister of DoE. The study was aimed at exploring the experiences of lecturers in the implementation NC(V) engineering curriculum since its inception in 2007.

In this study, Chapter 1 addressed the following objectives: To explore the views of the lecturers about NC(V) engineering curriculum, to find out the challenges that lecturers encounter in the implementation of NC(V) engineering curriculum and to learn about the support programmes that are available to the lecturers to assist them with engineering curriculum implementation (sub-section 1.6

Chapter 2 provided the information about TVET colleges, explanation of engineering curriculum and its importance and frameworks that underpin the study.

Chapter 3 discussed the research methodology used during the study, which is qualitative research. The constructivist-interpretive paradigm was also discussed as to how it will assist the researcher to investigate and interpret participants' views regarding factors that affect their performance

In Chapter 4 empirical data collected was analysed. Data was collected through individual interviews from NC(V) engineering lecturers at a selected college. The participants were responding to a set of similar research questions.

This chapter will give a summary of the findings of the study. Furthermore, the researcher will provide conclusions based on the participants' responses and generate recommendations where changes are needed and provides avenues for further

research. Limitations of the study will be stated and lastly the researcher will share the concluding remarks.

## **5.2 SUMMARY OF RESEARCH FINDINGS**

This section deals with a synopsis of the scholarly review and empirical research findings. Based on the responses from the participants the researcher is satisfied because all research questions were answered.

### **5.2.1 Key scholarly review findings**

The SA education system had to be involved in changing its curriculum to best cater for the citizens. Part of those changes affected the skills development, which was done in TVET colleges. One of the recommendations of the New Institutional Landscape document (DoE, 2001) was to reform technical education and align it with the objectives of the SA NQF, which would include creating a national framework of learning achievements, facilitating access to and progression in education and training, career paths and enhancing the quality of education and training (SAQA, 2001

It was indicated that there is high drop-out rate amongst challenges that lecturers are facing in the implementation of NC(V) engineering curriculum (Chapter 2, sub-section 2.2.2.3; table 2.4) Looking at the number of NCV engineering students who registered in 2018 as compare to the number completed shows a big difference. For all three engineering programmes the drop-out rate is higher than 50%.

One of the main challenges facing NCV curriculum (Chapter 2, sub-section 2.2.2.4 is the employers' attitude towards the TVET curriculum. This is critical as skills are developed for employment or entrepreneurship. If the employers do not value NCV graduates, that means they have no contribution towards skills development and economy.

In sub-section 2.3.1 TLT was chosen as the relevant theory for this study because in the process of teaching and learning, lecturers determine their way of acting, which allows them to make choices as well as to reject what they feel unworthy or irrelevant in

terms of curriculum procedures, ideas, policies or practices. Teachers/lecturers should be trained well to be professional and be given freedom to design their lessons according to factors affecting the environment of their students. Most TVET lecturers have been employed based on the qualification of their specialisation (sub-section 2.3.1.3). This mismatch of qualifications and expertise is affecting the quality of teaching and learning.

## **5.2.2 Synopsis of key empirical findings**

This section deals with the research findings according to the themes and categories (Chapter 4).

### **5.2.2.1 Curriculum**

Research findings revealed that the curriculum for NC(V) engineering curriculum was pitched too high for students with Grade 9. Lecturers felt that the high failure rate for NC(V) engineering programmes was because of the mismatch of students with limited capabilities to challenging curriculum. Some lecturers even shared that they checked the curriculum for the same qualifications at neighbouring universities and realised that they were the same as theirs.

### **5.2.2.2 Assessment**

It was discovered that lecturers fully understand the assessment processes and reporting. However, there was a concern that the assessments were not conducted properly because the practical assessment was compromised because workshops were not sufficiently equipped. The number of students to be assessed could not be accommodated hence some students were compelled to share stations.

### **5.2.2.3 Professional Development**

Most lecturers have never been to a workshop or training that is meant to develop them in their respective engineering subjects. Lecturers have never been to industry to learn new techniques of engineering to be in line with 21<sup>st</sup> century technology. However, they have attended assessor and moderator courses to improve their assessing and

moderating skills. technology. However, they have attended assessor and moderator courses to improve their assessing and moderating skills.

#### 5.2.2.4 Resources

All lecturers had classes with furniture. Libraries were available in both campuses even though they mentioned that those libraries are only open during hours. This was hindering access to these libraries as students attend classes during the day.

#### 5.2.2.5 Books

Research finding was that all students receive relevant books from the college. Lecturers were involved in choosing the best books for their respective subjects.

#### 5.2.2.6 Students' Attendance

Attendance was discovered to be one of the major problems for lecturers. During the second term, some class attendance dropped to 10%.

#### 5.2.2.7 Pass rate

For engineering-related subjects, the pass rate was very low. For some subjects in EIC the pass rate is below 10%

The throughput rate was also a concern for this college. One programme had no throughput for the past four years. This was disappointing because SA still has a shortage of engineers.

#### 5.2.2.8 Skills shortage

NC(V) engineering has a good curriculum to address skills shortage in this country. However, if the entry level is Grade 9, it is not easy to achieve because even their level of Mathematics and Science is still very low. The curriculum for these programmes is pitched very high for a Grade 9 student to master. If they admit only students with Grade 12, this curriculum will produce qualified engineers every year. All lecturers

believed that NC(V) engineering has a good curriculum that can address the skills shortage in SA, but drastic changes will have to be made to achieve this.

#### 5.2.2.9 Support

Mostly, lecturers require WIL to improve their knowledge of engineering subjects. They also mentioned the dire need of resources that are equivalent to the ones that are used in the industry so that their product is ready for jobs on completion of their studies.

### 5.3 RESEARCH CONCLUSIONS

Based on the findings of the study, it can be concluded that lecturers had a negative perception on how they view the adoption and implementation of the NC(V) engineering curriculum because there is high failure rate and very low throughput rate. It is also concluded that the current challenges that lecturers are facing in the implementation of NC(V) engineering curriculum is because of enrolling students who do not have an engineering background, which involves Mathematics and Science. In this case, Grade 12 certificate was a solution to the challenges. Which therefore implies that support programmes that lecturers are receiving in the implementation of the engineering curriculum are not effective because of the target market that does not match the level of the curriculum. Due to the identified features and characteristics of the TLT, it can be a possible innovative strategy of resolving challenges associated with the NC(V) engineering curriculum, its adoption and implementation may be a benefit to the growth and stability of the institutions.

The research conclusions are based on the main research question' responses which is "What are the lecturers' experiences in the implementation of the NC(V) engineering curriculum in a selected TVET college?" To answer the main question, the three sub-questions were formulated. During the interviews, the participants provided answers to these questions.

### **5.3.1 What are the views of the lecturers about the NC(V) engineering curriculum?**

All lecturers share the same common view about the NC(V) engineering curriculum, namely that is a good curriculum that can provide engineering skills to the youth. They believed that the NC(V) engineering curriculum could respond well to the shortage of engineers in SA. However, the content of the curriculum needs some serious upgrading.

### **5.3.2 What are the challenges that lecturers face in the implementation of NC(V) engineering curriculum?**

Lecturers have challenges in implementing NC(V) engineering curriculum. Their main challenge was enrolling students who passed Grade 9 as the highest grade (without Mathematics) into engineering programmes. Even though Mathematics is part of NC(V) engineering programmes but it does not help the students as it requires someone with a strong background in Mathematics. This matter creates more challenges for the lecturers and the curriculum itself. Students' attendance rate is very low because when they realise they are studying mainly theory and that the practical is merely used to practice what they have learned, they drop the classes with engineering-related subjects. The low attendance leads to fewer students writing the final examination at the end of the year. This results in the low pass rate and low throughput rate. Lecturers are also faced with a challenge regarding industry experience; they lack current industry knowledge and skills in engineering. The industry is implementing Fourth Industrial Revolution (4IR) technology and TVET colleges are expected to produce engineers who will comfortably fit into this milieu. None of the participants has been to the industry to learn and observe the new ways of working in the engineering field. For example, the mechanical engineers no longer check the car faults manually. Instead, they use technology to detect all mechanical problems and produce a report. Workshop equipment is outdated, which will require future employers to retrain the NC(V) engineering programmes' graduates before they can be employ them fully.



### **5.3.3 What support programmes do lecturers receive to assist them in implementing the engineering programmes?**

Lecturers mainly require support from the DHET to change the entry requirement for NC(V) engineering programmes from Grade 9 to Grade 12 with Mathematics as subject. They also require support for professional development as they feel that part of what they teach is no longer relevant. Workshops need to be upgraded.

## **5.4 RECOMMENDATIONS**

### **5.4.1 Systemic level**

#### **Recommendation 1: Directed to the Department of Higher Education and Training**

Since many students who passed Grade 12 cannot access university due to different reasons, the researcher recommends that the DHET consider changing the entry requirements for NC(V) engineering programmes to Grade 12 with Mathematics and Science as subjects, instead of Grade 9. Students who have passed Grade 9 are not a challenge for government in terms of furthering their studies, but Grade 12 students are putting strain on government because they do not have an alternative. If TVET colleges were to admit only students who have passed Grade 12, it will reduce the number of youths who cannot enter the higher education system. Because of that, programmes, such as NC(V) engineering, will be able to attract the right students. The DHET should also review the NC(V) curriculum on a yearly basis to adapt them to suit changes in the industry. It should also provide subject specific training to upskill lecturers. WIL should also be used since it plays an important role in the professional development of lecturers. Technology plays a big role in all professions and TVET colleges should therefore transform and adapt as needed.

#### **Recommendation 2: Directed to Technical Vocational Education and Training management**

The TVET management that comprises a central office and campus management should play a big role in changes that are expected from NC(V) engineering curriculum.

They should provide support and take recommendations from lecturers to the DHET. The management should form partnerships with different engineering industries and have a management plan, which allows lecturers to do WIL at selected industries on a yearly basis. The management should also provide workshops to lecturers on classroom management. They should make the DHET aware of the curriculum that has not had satisfactory throughputs for some years, so that such curriculum could be discontinued or revised. Since each programme gets funding allocation from the DHET, management should account for low or no throughput. This will compel them to discontinue or change the curriculum. This does not only affect the DHET financially but also the students who went through the curriculum and did not make it, they will have reduced chances of getting study funding in the future. The students who will in future get no funding from the government will increase youth unemployment, which could lead to an increase in crime. The college should implement curriculum for which they have the capacity to implement successfully.

#### **5.4.2 Institutional Level**

##### **Recommendation 3: Campus management**

The campus management have a huge role to play in minimising challenges facing lecturers. They need to have meetings that are aimed at discussing challenges based on the experiences and evidence they have of their campus performance. They should develop tools to monitor the implementation of NC(V) engineering curriculum and gather information regarding blockages. They should also make recommendations to the higher authorities about what needs to be changed or implemented. Campus management manages the curriculum and assessment; hence it is their duty to identify challenges and report them to the higher structures. Without the participation of campus management, the DHET will not receive reports about the status of campuses and will remain unaware of the problems. Campus management should use these platforms to communicate challenges they are facing as it may be affecting their work and contribute to a poor end-product.

##### **Recommendation 4: Directed to lecturers**

The researcher recommends that lecturers should take charge of classroom

management. Where the college is not providing, they should take the initiative to organise themselves. Failure of the curriculum affects their image as they spend much time teaching students. Lecturers should resolve challenges that are classroom- based. Challenges that are not classroom-based should be reported to the relevant authorities. The issue of late coming and absenteeism is a lecturer's responsibility and rules and procedures should be set to encourage students to attend. Lecturers should always be well prepared and use a variety of teaching methods to help students to understand the content. The lecturer should make it possible for students to understand the content and they should motivate students by organising study tours to visit different engineering companies. Students who have passed the programme and have joined the industry or university could be called to motivate and encourage other students every year.

### **5.4.3 Theory**

#### **Recommendation 5**

It is also recommended that due to the identified features and characteristics of the TLT, which suggest innovative strategies of resolving challenges associated with the NC(V) engineering curriculum, its adoption and implementation may be of benefit to the growth and stability of the institutions.

## **5.5 AVENUES FOR FURTHER RESEARCH**

With regard to the findings of this dissertation, the researcher proposed further research in order to address the challenges that TVET lecturers face in the implementation of NC(V) engineering curriculum. The researcher would like to investigate how technology can assist NC(V) engineering lecturers to implement NC(V) engineering curriculum successfully. Since the world is implementing the Fourth Industrial Revolution (4IR), it might occur that these lecturers' challenges arise from the use of old methods to find solutions to current problems in the engineering sector. TVET colleges have a big role to play in addressing the skills shortage and this sector should embrace change. Further research might look deeply into:

- a) Current technology used to implement engineering curriculum.
- b) The readiness of lecturers to use technology to teach their engineering subjects.
- c) WIL aimed at exposing lecturers into the world of engineering industries.
- d) Lecturer development in technology skills to prepare them for the Fourth Industrial Revolution (4IR).

The researcher believes that this contribution may assist in alleviating challenges that lecturers face and increase the throughput rate, which will eventually increase the number of engineers produced locally and even internationally.

## **5.6 LIMITATIONS OF THE STUDY**

The study cannot be generalised to all TVET colleges. Data was collected from one college and only two campuses participated in the study. The DHET administers 52 colleges, each has an engineering department. The use of data from one college cannot represent all colleges but based on the findings some issues revealed that there were national challenges, such as an outdated curriculum. The sample was from an urban college, which may differ from the experience of rural colleges. Provinces do not implement the same programmes in the same way. Therefore, the results might vary if a different college is used.

## **5.7 CONCLUDING REMARKS**

Since the researcher worked for four years as a campus manager at a TVET college managing the engineering campus, which offered the NC(V) engineering curriculum, it has always been a vision to do research to understand what the lecturers are experiencing in the NC(V) engineering curriculum. During that time, there were many complaints from lecturers that motivated the researcher to do this research. There was also a growing number of students who dropped out and the throughput was not improving. As a firm believer in teaching and learning, the researcher chose to investigate lecturers' experiences because they are at the forefront of the success or failure of the students. Teaching and learning cannot happen without teachers or lecturers. The welfare of lecturers is critical, as they are the implementers of the policies.

The level of dissatisfaction and discouragement from the lecturers was higher than the researcher could have imagined. If lecturers are demotivated, all the challenges that students and policy-makers have to face will remain unsolved and the shortage of engineering skills will remain or grow in this country. It was evident that most lecturers believe NC(V) has a great curriculum to produce engineering skills, provided it attracts the right students. Lack of staff development cripple the execution of skills by the lecturers. This calls for the employer (DHET) to design strategies that will empower and motivate lecturers and make necessary changes to advance its curriculum. A well-planned staff development programme should be put in place to ensure that all lecturers qualify to teach the relevant subjects.

It was discovered that lecturers encounter many challenges and there is little they can do to address some of these challenges. However, they can identify those that are manageable and intervene. For example, lecturers can attend to classroom challenges.

In closing, lecturers are willing to implement the changes, but they require relevant resources and training on how those changes should be implemented. They are also prepared to help the DHET and the college to identify the critical challenges and work with them to improve the programmes

## LIST OF REFERENCES

- Abawi, K. 2014. Training course in sexual and reproductive health research 2013. Data collection instruments. Geneva workshop, July 24, 2013.
- Akoojee, S. 2010. Intermediate skills development in South Africa: understanding the context, responding to the challenge. In *Constructing a democratic developmental state in South Africa: potentials and challenges*, edited by O. Edigheji. Cape Town: HSRC Press, pp. 261-282.
- Alkire, S. 2003. A conceptual framework for human security. Working paper 2, Oxford, Centre for Research on Inequality, Human Security and Ethnicity (CRISE).
- Anderson, C.A. 1967. The social context of educational planning. UNESCO, International Institute for Educational Planning.
- Anney, V.N. 2014. Ensuring the quality of the findings of qualitative research: looking at trustworthiness criteria. *Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS)* 5(2): 272-281.
- Arfo, E.B. 2015. A comparative analysis of technical and vocational education and training policy in selected African countries. Unpublished thesis, University of KwaZulu-Natal, Durban.
- Atkins, L. & Wallace, S. 2012. *Qualitative research in education*. Sage: London, Carlifonia.
- Babbie, E.R. 2007. *The basics of social research*. London: Wadsworth.
- Badroodien, A. 2003. Enterprise training in Human Sciences Research Council. Human resources development review 2003: Education, employment and skills in South Africa. Cape Town: HSRC Press.
- Badugela, T.M. 2012. Problems facing educators in implementing the National Curriculum Statement: the case of Tshifhena Secondary School, Vhembe District, Limpopo Province, South Africa, University of South Africa, Pretoria. <http://hdl.handle.net/10500/7642>. (Accessed on 10 July 2018)
- Bakkabulindi, F.E.K., Mugagga, A.M., Shopi, J.M. & Kabasiita, J. 2015. Application of the Unified Theory of Acceptance and Use of Technology to the use of ICT by undergraduates in the School of Education, Makerere University. *African Higher Educational Review*, 9(1&2): 3-17. <https://www.coe.unt.edu/african-highereducation-review>. (Accessed on 13 January 2018.)

- Barnes, C.F. 2004. *The transformation of technical colleges into Further Education and Training colleges: a decision-oriented evaluation of the Northern Cape Urban Further Education and Training College*. Unpublished thesis submitted in fulfilment of the requirements for the degree Philosophiae Doctor), University of the Free State, Bloemfontein.
- Baxter, P. & Jack, S. 2008. Qualitative case study methodology: study design and implementation for novice researchers. *The Qualitative Report*, 19(40): 9-15.
- Bhat, A. Empirical research: definition, methods, types and examples  
<https://www.questionpro.com/blog/empirical-research/>. (Accessed on 21 October 2019).
- Billing, D. 1982. The role of staff development, Birmingham, SCEDSIP. Occasional Paper 6.
- Bowen, G.A. 2009. Supporting a grounded theory with an audit trail: an illustration. *International Journal of Social Research Methodology*, 12(4): 305-316. doi: 10.1080/13645570802156196.
- Braun, V. & Clarke, V. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2). ISSN1478-0887 Available from:  
<http://eprints.uwe.ac.uk/1173>. (Accessed on 5 April 2019).
- Buczynski, S. & Hansen, C.B. 2010. Impact of professional development on teacher practice: uncovering connections. *Teaching and Teacher Education*, 26(3): 606.
- Bubb, S. & Earley, P. 2004. *Managing Teacher Workload: work-life balance and wellbeing* London: Sage/Sage/Paul Chapman
- Cambridge online diary. 2019. <https://dictionary.cambridge.org/dictionary/English/pass-rate>. (Accessed on 2 October 2019.)
- Cattington, L.E. 2010. (Ed). *Handbook of curriculum development*. New York: Nova Science Publishers, Inc.
- Chisholm, L. 2000. The politics of curriculum review and revision in South Africa. Presented at the 'Oxford' International Conference on Education and Development, 9-11 September 2003 at the session on Culture, Context and the Quality of Education.

- Choy, S. 2009. Transformational learning in the workplace. Queensland University of Technology, <https://doi.org/10.1177/1541344609334720>. (Accessed on 23 November 2017.)
- Cohen, L., Manion, L. & Morrison, K. 2007. *Research methods in education*: 6th edition. London: Routledge.
- Cong, S. & Wang, X. 2012. A perspective on technical and vocational education and training. College of Applied Science and Technology, Beijing Union University, Beijing.
- Council on Higher Education. 2013. Amendment Act (no. 39 of 2008). Pretoria: Government Printers.
- Cranton, P. (Ed.) 1997. Transformative learning: theory to practice. New directions for adult and continuing education: No. 74. Transformative learning in action: Insights from practice (pp. 5-12). San Francisco, CA: Jossey-Bass.
- Creswell, J.W. 2003. *Research design, qualitative, quantitative and mixed methods approach*. 2<sup>nd</sup> ed. Sage. United Kingdom: Boston.
- Creswell, J.W. 2009. *Research design, qualitative, quantitative and mixed methods approach*. 3<sup>rd</sup> edition. Sage. United Kingdom: Boston.
- Creswell, J.W. 2012. *Research design, qualitative, quantitative and mixed methods approach*. 5<sup>th</sup> revised ed. Sage. United Kingdom: Boston.
- Creswell, J.W. 2014. *Research design, qualitative, quantitative and mixed methods approach*. 4<sup>th</sup> edition. Los Angeles: Sage.
- Crowell, S., Creswell, K., Robertson, A., Huby, G., Avery, A. & Sheikh, A. 2011. The case study approach. BMC Medical Research Methodology. <https://doi.org/10.1186/47-2288-11-100>. (Accessed on 29 October 2019).
- Cummins, J. 2009. Transformative multi-literacies pedagogy: school-based strategies for closing the achievement gap. *Multiple voices for Ethnically Diverse Exceptional Learners*, 11(2): 38-56.
- Dastkhan, H. & Owlia, M.S. 2011. Study of trends and perspectives of industrial engineering research, *SAFRJIND ENG*, 20(1).
- De Vault, G. 2017. Establishing trustworthiness in qualitative research. *Qualitative Research* - 2297042. (Accessed on October 24, 2018). De Vos, A.S., Strydom, H., Fouché, C.B. & Delport, C.S.L. 2011. *Research at grassroots: for the social sciences and human service profession*. Pretoria: Van Schaik.
- Denzin, N.K. & Lincoln, Y.S. (Eds.) 2011. *The SAGE Handbook of Qualitative*



- Research*. 5th edition. Thousand Oaks, CA: Sage.
- Department of Education. 2001. Education in South Africa: achievements since 1994. Pretoria: Government Printer.
- Department of Education and Training. 2006. National Policy Regarding Further Education and Training Programmes: Approval of the documents, Policy for the National Certificate (Vocational): Qualifications at Level 2 to 4 on the National Qualifications Framework (NQF). Pretoria. Government Gazette
- Department of Higher Education and Training. 2010. Statistics on post-school education and training in South Africa: Pretoria. Government Printers.
- Department of Higher Education and Training. 2011. Formal Further Education and Training College Programmes at Levels 2 to 4 on the National Qualifications Framework (NQF). Pretoria: Government Printers.
- Department of Higher Education and Training. 2013. Policy of professional qualifications for lecturers in technical and vocational education training. Pretoria. Government Gazette.
- Department of Higher Education and Training. 2013. White Paper for post-school education and training: building an expanded effective and integrated post school system. Pretoria. Government Printers.
- Department of Higher Education and Training. 2014. Statistics on post-school education and training in South Africa: 2012. Pretoria: Government Printers.
- Department of Higher Education and Training. 2015. Statistics on post-school education and training in South Africa: 2013. Pretoria. Government Printers.
- Department of Higher Education and Training. 2016. Statistics on post-school education and training in South Africa. Pretoria: Government Printers.
- Department of Higher Education and Training. 2017. Statistics on post-school education and training in South Africa: 2013. Pretoria. Report.
- Department of Higher Education and Training. 2016. Policy of professional qualifications for lecturers in technical and vocational education training: 2013. Pretoria. Government Gazette.
- Department of Higher Education and Training. 2018. Policy of professional qualifications for lecturers in technical and vocational education training: 2013. Pretoria. Government Gazette.

- Driscoll, M. 2000. *Psychology of learning for instruction*. Boston: Allyn & Bacon.
- Druzhinina, M. Belkova, N. Donchenko, E. Liu, F & Morozoval, O. 2018. Curriculum Design in Professional Education: Theory and Practice. Available from <https://doi.org/10.1051/shsconf/20185001046>. (Accessed on 27 June 2020)
- Du Plessis, L.E. 2005. The implementation of Outcomes- Based Education in the Eastern Cape. A management perspective at micro level. Unpublished D.Ed. thesis, UNISA.
- Engineering Council of South Africa. 2011. Annual Report 2010/11.
- Education, Training and Development Practices Sector Education and Training Authority (ETDP SETA). 2011. Public Further Education and Training Sector Skills Plan. Available at [www.ETDP SETA.org.za](http://www.ETDP SETA.org.za). (Accessed on 10 August 2017).
- Fien, J., Maclean, R. & Park, M. 2009. *Work learning and sustainable development*. Dordrecht: Springer.
- Garba, M. 2004. The Critical Role of Educational Resources on Curriculum Implementation in Noah, A.O.K., Shonibare, D.O. A.A. and Olujuwon, T (Eds)s curriculum implementation and professionalizing teaching in Nigeria. Lagos: Central Educational Services.
- Gewer. A. 2010. DBSA: Improving quality and expanding the further education and training college system to meet the need for an inclusive growth path.
- Gillham, B. 2000. *Developing a questionnaire*. London: Continuum.
- Glickman, C.D. 1981. Developmental supervision, alternative practices for helping teachers improve instruction (Alexandria, VA. Association for Supervision and Curriculum Development, 1981) [www.eric.gov](http://www.eric.gov). (Accessed on 10 August 2017).
- Glickman, C.D. 1985. *Supervision of instruction: a developmental approach*. Newton, MA: Allyn and Bacon.
- Glickman, C.D., Gordon, S. P. & Ross-Gordon, J.M. 2014. Supervision and instructional leadership: a developmental approach. Pearson.
- Govender, C.M. & Wait, M. 2017. Work integrated learning benefits for student career prospects: mixed-mode analysis. *South African Journal of Higher Education* <http://dx.doi.org/10.28535/31-5-609>. 31(5): 49–64. (Accessed 20 October 2019.)
- Green, N. 2008. Formulating and refining a research question. In Gilbert, N. (Ed),

- Researching social life*. 3<sup>rd</sup> edition. London: Sage, pp. 43-61.
- Grisay, A. & Mahlck, L. 1991. The quality of education in developing countries: a review of some research studies and policy documents. *Issues and Methodologies in Educational Development*: an IIEP Series for Orientation and Training.
- Gross, N., Guiaquinta, J. & Bernstein, M. 1971. *Implementing organizational innovations*. New York: Basic Books.
- Gustafsson, J. 2017. Single case studies vs multiple case studies: a comparative study. Academy of Business, Engineering and Science. Halmstad University, Halmstad, Sweden.
- Hammond, L., Wei, R., Andree, A., Richardson, N. & Orphanos, S. 2009. Professional learning in the learning profession: a status report on teacher development in the United States and abroad. Palo Alto, CA: School Redesign Network at Stanford University.
- Hanekom, S.X. 1987. *Public policy framework and instrument for action*. Johannesburg: Macmillan.
- Harris, J. 1999. Ways of seeing the recognition of prior learning: What contribution can such practices make to social inclusion? *Studies in the Education of Adults*, 31(2): 124-139.
- Harris, K. Santangelo, Hayward, B.A. 2008. Employee performance, leadership style and emotional intelligence: an exploratory study in a South African parastatal. *Behavior Genetics*, Vol.8 No.1. Rhodes University, Grahamstown, South Africa.
- Hay, A. & Hodgkinson, M. 2006. Rethinking leadership: a way forward for teaching leadership? *Leadership Organization Development Journal*.
- Heller, J.I., Daetler, K.R., Wong, N., Shinohara, M. & Miratrix, L.W. 2012. Differential effects of three professional development models on teacher knowledge and student achievement in elementary science. *Journal of Staff Development* 24 36-41. Webridge.
- Human Resource Development Council for South Africa. 2014. TVET colleges in South Africa: Pathways workstream.
- Ivowi, U.M.O. 2004. Curriculum Implementation: Implication for school administration in Noah, A.O.K., Shonibare, D.O. A.A. and Olujuwon, T (Eds)s curriculum implementation and professionalizing teaching in Nigeria. Lagos: Central

Educational Services.

Killen, R. 2007. *Teaching strategies for outcomes-based education*. Juta and Company Ltd: SA.

Knowles, M.S. 1989. *The making of an adult educator: an autobiographical journey*. San Francisco: Jossey-Bass Inc. Pub.

Lacono, J.C., Brown, A. & Holtham, C. 2011. The use of the case study method in theory testing: the examples of steele-market places. *The Electronic Journal of Business Research Method*. Vol. 9. Issue 1.

Lebied, M. 2018. A guide to the methods, benefits and problems of the Interpretation of data. The datapine Blog. [Datapine.com/blog/data-interpretation-methods-benefits-problems/](https://datapine.com/blog/data-interpretation-methods-benefits-problems/) (Accessed on 4 November 2019).

Leedy, P.D. & Ormrod J.E. 2010. *Practical research planning and design*. Tokyo: Pearson Education International.

Livesey, C. 2006. As Sociology: Revision Sociological Methods. [www.sociology.uk.org](http://www.sociology.uk.org) (Accessed on 24 August 2019).

Mabale, M.B. 2012. Challenges faced by lecturers in the implementation of National Certificate Vocational Curriculum at Mopane South East College, University of Limpopo.

Maclean, R. & Pavlova, M. 2013. Vocationalization of secondary and higher education: pathways to the world of work, in revisiting global trends in TVET: Reflections on theory and practice, edited by K. Ananiadou. Bonn: UNESCO-UNEVOC.

Maclean, R. 2010. The power of education: lifelong learning for sustainable development, peace building and the end of poverty. Chair Professors Public Lecture Series. Hong Kong, Hong Kong Institute of Education.

Macnee, L. C. & McCabe, S. 2008. *Understanding nursing research: using research evidence-based practice*. Philadelphia, PA: Lippincott Williams & Wilkins.

Maidment, H. 2017. TVETs, University of Technology and universities: What is the difference? Educonnect.

Maree, K. 2007. *First steps in research*. Pretoria: Van Schaik.

Maree, K. 2012. *First steps in research*. Pretoria: Van Schaik.

Mata, L. 2012. Key Factors of Curriculum Innovation in Language Teacher Education. *World Academy of Science, Engineering and Technology*. 66: (512-520). Available at: <http://www.waset.org/journals/waset/v66/v66-95.pdf>. (Accessed

- on 13 January 2013).
- McEwen, M. & Wills, E.M. 2014. *Theoretical basis for nursing*. 4<sup>th</sup> edition. Philadelphia PA: Wolters Kluwer/Lippincott Williams & Wilkins.
- McMillan, J.H. & Schumacher, M. 2014. *Research in education: evidence-based inquiry*. 7<sup>th</sup> edition. Boston: Pearson New International Edition.
- McMillan, J.H. & Schumacher, S. 2006. *Research in education: evidence-based enquiry*. 6<sup>th</sup> edition. Boston: Pearson.
- McMillan, J.H. & Schumacher, S. 2010. *Research in education*. 7<sup>th</sup> edition. Boston: Pearson.
- Mertens, D.M. 2010. Transformative Mixed Methods Research. *Journal of Mixed Methods Research*. Sage Journals, 16(6): 469-474.
- Meyer, M. (ed). 2012. *Managing human resource development: a strategic learning approach*. 4<sup>th</sup> edition. Durban: Lexis Nexis.
- Meyer, M. 2002. *Managing HRC: an outcomes-based approach*. 2<sup>nd</sup> ed. Cape Town: Interpak Books.
- Meyer, M. 2007. *Managing human resource development*. 3<sup>rd</sup> ed. Cape Town: Lexis Nexus.
- Meziebi, K.A. 1993. Social Studies Curriculum. Owerri Whyte and Whyte.
- Mezirow, J. 1994. Understanding transformation theory. *Adult learning*. Vol.44. No.4. Summer1994.
- Mezirow, J. 1997. Transformative learning: Theory to Practice: New directions for Adult and Continuing Education 74: 5-12.. <http://dx.doi.org/10.1002/ace.7401>. (Accessed on 13 November 2018).
- Mezirow, J. 2003. Transformative learning as discourse. *Journal of transformative education*, 1(1): 58-63.
- Mgijima, M.N. 2014. Needs-based professional development of lecturers in further education and training colleges: a strategic imperative. *Mediterranean Journal of Social Sciences*, 5(2): 359-369.
- Miles, M.B. & Huberman, A.M. 1994. *Qualitative data analysis: an expanded source book*. 2<sup>nd</sup> edition. Newbury Park, CA: Sage.
- Mokone, K. 2011. The impact of academic development programmes on the performance of lecturers in the classroom at public further education and training colleges. <http://www.sadtu.org.za/>. (Accessed on 27 August 2017).
- Mouton, J. 1996. *Understanding social research*. Pretoria: JL van Schaik.

- Msweli, P. 2011. *Writing a research proposal: practical guidelines for business students*. Cape Town: Juta.
- Munyao, R. 2015. Causes of low retention of girl child in primary school: A case study of Kivingoni primary school in Yatta sub County of Machakos County. Nadler, L. 1970. Developing human resources.
- Naicker, I. 2005. *A critical appraisal of policy on educator post provisioning in public schools with reference to secondary schools in KwaZulu-Natal*. Unpublished thesis submitted in fulfilment of the Doctor of Education (DEd) in the discipline. University of KwaZulu-Natal.
- National Development Plan. 2011. Vision for 2030. ISBN, Pretoria.
- Newman, M. 2012. Calling transformative learning into question: some mutinous thoughts, *Adult Education Quarterly*, 62(1): 36-55.
- Ngulube, P. 2015. Trends in Research Methodological Procedures used in Knowledge Management Studies (2009-2013). *African Journal of Library, Archives and Information Science* 24(2).
- Ngulube, P. 2018. Overcoming the Difficulties Associated with Using Conceptual and Theoretical Frameworks in Heritage Studies. Chapter in a book.
- Nkalane, K.N. 2015. Factors influencing quality assessment practices in Business Studies at Technical Vocational Education and Training. Unpublished MEd dissertation, University of South Africa, Pretoria.
- Ntombela, S. 2018. M&D workshop 4-6 April held at the University of South Africa, Pretoria.
- OECD. 2008. Creating effective teaching and learning environments: first results from Talis. Paris: OECD Publication.
- OECD. 2009. Creating effective teaching and learning environments: first results from Talis. Paris: OECD Publication.
- Offorma, G. 2005. Increasing Professionalism in Teaching and Learning. University of Nigeria, Nsukka, Nigeria. *International Journal of Arts and Technology Education*.
- Olivia. 2017. What is trustworthiness in qualitative research? (Accessed on 24 October 2017).

- Oltmann, S.M. 2016. Qualitative interview: a methodological discussion of the interviewer and respondent contexts. [37 paragraphs]. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, 17(2), Art. 15, <http://nbn-resolving.de/urn:nbn:de:0114-fqs1602156>. (Accessed 4 June 2018).
- Olusegun, B.S. 2015. Constructivism learning theory: a paradigm for teaching and learning. Department of Psychology Federal University of Education, Kano *IOSR Journal of Research & Method in Education (IOSR-JRME)* e-ISSN: 2320–7388,p-ISSN: 2320–737X 5(6)I, 66-70 [www.iosrjournals.org](http://www.iosrjournals.org). (Accessed on 4 June 2018).
- Paris, R. 2001. Human security: paradigm shift or hot air? *International Security*, 26(2): 87-102.
- Penh, P. 2005. Mainstreaming Disability in Development. The Example of Inclusion. United Kingdom: School of Education, University of Manchester.[www.eenet.org.UK](http://www.eenet.org.UK). (Accessed on 15 July 2020)
- Perloff, R. 2004. “Managing and leading: The universal importance of, and differentiation between, two essential functions.” Talk presented at Oxford University, July 14–15. Priestland, A.
- Pierre, F.B. 2010. Managing skill shortages in the Australian public sector: issues and perspectives, *Asia Pacific Journal of Human Resources* 48 (3): 262-286.
- Psacharopoulos, G. 1980. Returns on education: an updated international comparison. *Comparative Education*.17(3): 321-341.
- Psacharopoulos, G. 2004. Public versus private university systems. *CESIfo DICE report*, 2(4): 39-43.
- Psacharopoulos, G. 2006. World Bank policy on education: a personal account. *International Journal of Educational Development*, 26(3): 329-338.
- Ramadikela, M.R. 2012. The management of parent involvement in historically disadvantaged secondary schools in Tshwane West District, Gauteng. Unpublished MEd Dissertation, University of South Africa, Pretoria.
- Rogan, J., & Grayson, D. (2003). Towards a theory of curriculum implementation with particular reference to science education in developing countries. *International Journal of Science Education*, 25, 1171– 1204.

- Rehman, A.A. & Alharthi, K. 2016. An introduction to research paradigms. *International Journal of Education Investigations*. Available online @ [www.ijeionline.com](http://www.ijeionline.com) 2016 (October), 3(8): 51-59. (Accessed on 23 March 2018).
- Richards, K. 2003. *Qualitative inquiry in Tesol*. Hampshire: Palgrave Macmillan.
- SAIIE. 2015. Definition of Industrial Engineering, [saiie.co.za](http://www.saiie.co.za) [Online]. Available: <http://www.saiie.co.za/>. (Accessed on 12 June 2019).
- Sarantakos, S. 2013. *Social research* (3rd ed.). New York: Palgrave Macmillan.
- Saunders, M., Lewis, P. & Thornhill, A. 2016. Research methods for business students. 7<sup>th</sup> ed. Pearson Education Limited, Harlow: England.
- Schulte, B. 2015. (Dis) Empowering technologies: ICT for education (ICT4E) in China, past and present. *Chinese Journal of Communication*, 8(1): 59-77.
- Schutte, C.S. 2015. SAIIE Presidential Address 2011, presented at the SAIIE AGM, Johannesburg, 2011, pp.1–23. [16]LHA Management Consultants, “Study of the Work Performance of NDip and BTech Industrial Engineers”, SAIIE, Sep. 2015.
- Schwandt, T.A. Lincoln, Y.S. & Guba, E.G. 2007. Judging interpretations: But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New Directions for Evaluation* (114) 11-25. doi: 10.1002/ev.223.
- Schweitzer, K.2019. Curriculum Design: Definition, Purpose and Types. Available from <https://www.thoughtco.com/curriculum-design-definition-4154176>.(Accessed on 28 June 2020).
- Scott, D. & Usher, R. 1999. Researching Education. 3<sup>rd</sup> ed. Data Methods and Theory in Educational Enquiry.
- Seale, C.1999. *The quality of qualitative research*. New Delhi: Sage.
- Shenton, A. 2004. Strategies for ensuring trustworthiness in qualitative research projects. 6 January 2004. <http://www.crec.co.uk/docs/Trustworthypaper.pdf>. (Accessed on 16 February 2015).
- Sheppard, M. 2012. *Social work and social exclusion: the idea of practice*. Ashgate Publishing, Ltd, UK: Hampshire.
- Siegler, R.S., DeLoache, J. & Eisenberg, N.2003. How Children Develop. New York: Worth Publishers.
- Silverman, D. 2000. *Doing qualitative research: a practical handbook*. Thousand Oaks, CA: Sage.



- Simon, M.K. & Goes, J. 2011. Developing a theoretical framework. Dissertation and scholarly research: recipes for success. Seattle, W.A: Dissertation Success LLC.
- Sondlo, M. 2013. A comparative study of student retention and throughput in a postgraduate distance education programme. Unpublished MEd dissertation, Faculty of Education. University of Pretoria, Pretoria.
- South African Qualifications Authority (SAQA). 2001. Criteria and guidelines for assessment of NQF registered unit standards and qualifications. Pretoria: Government Printers.
- South African Qualifications Authority. 2013. Umalusi Council for Quality Assurance in General and Further Education and Training. Directives for Certification National Certificate Vocational. Pretoria.
- Sperotto, F. 2015. The development of the industrial engineering profession in South Africa. *SAFRJINDENG*, 26(2): 1-9.
- Sunday, CE. [sa] Qualitative data analysis: division for Postgraduate Studies (DPGS) Post-graduate Enrolment and Throughput Program (PET). University of the Western Cape.
- Swanson, K.W. 2010. Constructing a learning partnership in transformative teacher development. *Reflective Practice*, 11(2): 259-269.
- Tam, M. 2000. Constructivism, instructional design, and technology: implications for transforming distance learning. *Educational Technology and Society*, 3(2): 50-60.
- Tancott, G. 2014. National scarce skills list-SA needs engineers.  
<https://Infrastructurenews.co.za/2014/05/30/national-scarce-skills-list-sa-needs-engineers/>. 7 July 2017.
- Tawil. 2012. Education policy and planning masters in human rights and ethics of international cooperation, University of Bergamo, Education Policy and Planning Process Sobhi TAWIL 8-10 March 2012.
- Taylor, E.W. 2007. An update of transformative learning theory: a critical review of the empirical research (1999–2005), *International Journal of Lifelong Education*, 26(2): 173-191.
- Thomas, L.E. & Lleras, A. 2009. Swinging into thought: Directed movement guides insight in problem-solving. *Psychonomic Bulletin & Review* 16(4): 719-715 doi: 10.3758/PBR.16.4.719.

- Thompson, A.R. 1981. *Education and development in Africa: an introduction to the study of the role education may play in national development intended primarily for teachers in training and in service*. Macmillan: London.
- Tikly, L. 2013. Conceptualizing TVET and development: a human capability and social justice approach, in *Revisiting global trends in TVET: reflections on theory and practice*, edited by K. Ananiadou. Bonn: UNESCO-UNEVOC.
- Tobin, G.A. & Begley, C.M. 2004. Methodological rigour within a qualitative framework. *Journal of Advanced Nursing*, 48(4): 388-396.  
doi:10.1111/j.1365-2648.2004.03207. x.
- Tongo, M.D. 2007. Purposive sampling as a tool for informant selection.  
[www.ethnobotanyjournal.org/vol5/i1547-3465-05-147](http://www.ethnobotanyjournal.org/vol5/i1547-3465-05-147). (Accessed on 7 June 2017).
- Toor, S.R. & Ofori, G. 2008. Leadership and management in engineering: how they are different and why. *Leadership Management in Engineering*, 2008, 8(2): 61-71.
- UNESCO. 2004. Learning for work, citizenship and sustainability: the Bonn declaration. Paris: UNESCO.
- UNESCO. 2012. *Transforming TVET: Building skills for work and life, Main Working Document. Third International Congress on Technical and Vocational Education and Training*: Shanghai, People's Republic of China, 13-16 May 2012.
- UNESCO. 2015. Learning for work, citizenship and sustainability: The Bonn declaration. Paris: UNESCO.
- UNEVOC.2011. Gender issues and TVET. Available from [www.unevoc.unesco.org/tvetipedia.0.html?&tx\\_drwiki\\_pi1%5Bkeyword%5D=Gender%20issues%20and%20TVET](http://www.unevoc.unesco.org/tvetipedia.0.html?&tx_drwiki_pi1%5Bkeyword%5D=Gender%20issues%20and%20TVET). (Accessed on 12 July 2018).
- University of South Africa. 2012. Curriculum Policy. Pretoria: Unisa.
- University of South Africa. 2015. Assessment Policy. Pretoria: Unisa.
- University Press. 2008. Cambridge Online. Cambridge English Dictionary.
- Van der Vyver, C.P., Van der Westhuizen, P.C. & Meyer, L.W. 2013. The caring school leadership questionnaire. *South African Journal of Education*, 34(3): 17.

- Verster, J. 2011. Presentation on the current FET lecturer profile. Workshop on Continuing Professional Development for FET lecturers. Benoni: SACPO.
- Wadsworth, B.J. 2004. *Piaget's theory of cognitive and affective development: Foundations of constructivism*. Longman Publishing.
- Walsham, G. 1993. *Interpreting information systems in organizations*. Chichester: John Wiley and Sons.
- Wedekind, V. 2010. Chaos or coherence? Further education and training college governance in post-apartheid South Africa. *Research in Comparative and International Education*, 5(3): 302-315.
- Wedekind V & Mutereko S. (2016) Higher education responsiveness through partnerships with industry: The case of a university of technology programme. *Development Southern Africa* 33:3: 376-389.
- Wedekind, V. & Watson, A. 2012. Understanding complexity in the FET college system: an analysis of the demographics, qualifications, and experience of lecturers in sixteen FET colleges across Gauteng and KwaZulu-Natal. Section in a bulletin.
- Werner, J.M. 2009. *Human resource development*. 5<sup>th</sup> edition. Cengage Learning.
- Willemse, J. 2002. Overview of legislation impacting on skills development in South Africa. [http://www.wrseta.org.za/smme/private/smme\\_downloads/orientation/orienb.pdf](http://www.wrseta.org.za/smme/private/smme_downloads/orientation/orienb.pdf). (Accessed on 13 May 2018).
- Wolf, P. 2007. Fostering critical reflection in Higher Learning: the self-study of practitioner and coach. Master's dissertation of Adult Education. Saint Francis Xavier University Antigonish, Nova Scotia.
- World Bank. 2011. Learning for all: investing in people's knowledge and skills to promote development World Bank Group Education Strategy 2020. Washington DC: World Bank.
- Yin, R.K. 1984. *Case study research: design and methods*. Beverly Hills, CA: Sage.
- Yin, R.K. 2003. *Case Study Research: Design and Methods*, 3<sup>rd</sup> ed. New Delhi: Sage.
- Yin, R.K. 2014. *Case Study Research: Design and Methods*, 5<sup>th</sup> ed. Thousand Oaks, CA: Sage.
- Yorke, M. 1997. Staff development in further and higher education: a review. *British Journal of Teacher Education*, 3(2): 161-168.

Yukl, G.1999. "An evaluative essay on current conceptions of effective leadership."

*Eur. J. Work and Org. Psy.*, 8(1): 33-48.

Zohrabi, M. 2013. Mixed method research: instruments, validity, reliability and reporting findings. *Theory and Practice in Language Studies*, 3(2): 254-262.

Academy Publisher: Finland.

## **Appendix A**

### **Request for permission to conduct research at Thekwini TVET College**

Title of the title of your research: **Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in a selected Technical Vocational Education and Training Colleges.**

Date: 16 March 2018

Attention: Ms R Pillay

Department of Higher Education and Training

Contact details of the person 012 3126191 or Pillay.r@dhet.gov.za

Dear Sir/Madam

I, Patricia Ningi Sibisi am doing research under supervision of EC du Plessis, a professor in the Department of Curriculum and Instructional Studies towards MED at the University of South Africa. We are inviting you to participate in a study entitled "Lecturers' experiences in the implementation of National Certificate Vocational Engineering in Technical Vocational Education and Training Colleges: A case study of Thekwini TVET College."

The aim of the study is to explore the experiences of the NCV engineering lecturers in the implementation of engineering programmes.

Your department has been selected because it is the custodian of TVET Colleges and offer NCV engineering programmes.

The study will entail NCV engineering lecturers. Face-to-face interviews will be conducted on their experiences regarding the implementation of NCV engineering programmes. Interviews will take a maximum of 45 minutes per participants.

The benefits of this study is the opportunity for lecturers to reflect on their teaching and learning experiences. Lecturers will plan for improvement where necessary based on

their experiences and challenges. This study is aimed at bringing changes for the betterment of the NCV engineering programmes based on participants' sharing best practices.

There will be no risks to the participants. Lecturers will be interviewed at their workstations outside of teaching and learning time.

There will be no reimbursement or any incentives for participation in the research.

Feedback procedure will entail final dissertation that will be available to all including participants. Participants can also request the findings from Ms PN Sibisi on 012 4294897/ 0827584579 or Esibisp1@unisa.ac.za.

Yours sincerely

\_\_\_\_\_ (insert signature of researcher)

\_\_\_\_\_ (insert name of the above signatory)

\_\_\_\_\_ (insert above signatory's position)

## Appendix B

### Permission letter to conduct research



Enquiries: PA to the Principal  
Imibuzo: Ms N Dlamini  
Navrae:

Telephone: 031 250 8400  
Fax Number: 031 250 8404  
Address:

Date: 2018-09-03  
Usuku:  
Datum:

Ms PN Sibisi  
P.O. Box 3708  
Durban  
4000

Dear Ms Sibisi

#### RE: REQUEST FOR USING COLLEGE AS SITE OF RESEARCH

Thekwini TVET College has no objection to you using our College as a site of research on lecturers' experience in the implementation of National Certificate (Vocational Engineering) in a selected Technical Educational and Training College.

However, the following conditions for external research apply:

- The College will have right to approve content with regard to research instruments and research analysis.
  - The relevant documents must be forwarded to the College Principal and approval of usage will be given by the College Principal in writing.
- The name of the College or any of its sites cannot be used in any documents
- The name/s of staff employed by the college cannot be used.
- The use of any findings that reflect negatively on the College, its partners or any related body must be approved in writing by the College Principal.

Please note that the failure to comply with all of the above conditions will result in the necessary legal action against you.

Your cooperation in this regard will be highly appreciated.

Yours faithfully

Mr. NE Mchunu  
College Principal

I have read the content of this letter and I accept the conditions

NAME

SIGNATURE

DATE

**Appendix C**  
**Participant informed consent form**

**Consent to participate**

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in a selected Technical Vocational Education and Training Colleges.**

I, \_\_\_\_\_ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study. I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

Patricia Ningi Sibisi

-----

-----



Signature of participant

Date: \_\_\_\_\_

Signature of participant

Date: \_\_\_\_\_

## Appendix D

### Consent forms

#### APPENDIX D: Participant informed consent form

##### Consent to participate

CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.

I, S. B. Cele (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.


I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

Sibongiseni Cele

Patricia Ningi Sibisi



Signature of participant

Signature of researcher

Date: 21/09/18

Date: 20/09/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, R. MAHARAJ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

Ravi Maharaj

Patricia Ningi Sibisi





Signature of participant

Signature of researcher

Date: 17/09/18

Date: 20/09/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, Z. Essack (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

I have been assured that I will receive a signed copy of the informed consent agreement.


Name & Surname of participant (print)

Name & Surname of researcher (print)

ZOHRA ESSACK

Patricia Ningi Sibisi





Signature of participant

Signature of researcher

Date: 17/09/2018

Date: 20/09/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, J. Mukungu (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

J. Mukungu

Patricia Ningi Sibisi

[Signature]

[Signature]

Signature of participant

Signature of researcher

Date: 17/09/18

Date: 20/09/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, K. VENKASAMY (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

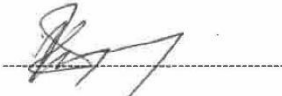
I have been assured that I will receive a signed copy of the informed consent agreement.

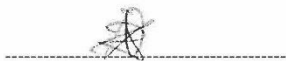
Name & Surname of participant (print)

Name & Surname of researcher (print)

K. VENKASAMY

Patricia Ningi Sibisi





Signature of participant

Signature of researcher

Date: 17/09/2018

Date: 20/07/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, R.S. MKUNGBELA (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.


I have been assured that I will receive a signed copy of the informed consent agreement.


Name & Surname of participant (print)

Name & Surname of researcher (print)

RETHABILE S. MKUNGBELA

Patricia Ningi Sibisi





Signature of participant

Signature of researcher

Date: 17/09/2018

Date: 20/09/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, K.P. NXUMALO (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

I have been assured that I will receive a signed copy of the informed consent agreement.


Name & Surname of participant (print)

Name & Surname of researcher (print)

K.P. NXUMALO

Patricia Ningi Sibisi





Signature of participant

Signature of researcher

Date: 17/09/2018

Date: 20/07/2018



## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, N. E. Bux (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

NIDAM . E. Bux

Patricia Ningi Sibisi

[Signature]

[Signature]

Signature of participant

Signature of researcher

Date: 17/09/2018

Date: 20/09/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, R.P. MANTSHONGA (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

REFILOE P. MANTSHONGA

Patricia Ningi Sibisi

[Signature]

[Signature]

Signature of participant

Signature of researcher

Date: 17/09/2018

Date: 20/09/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, P. SOUJE (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

PETER SOUJE

Patricia Ningi Sibisi

[Signature]

[Signature]

Signature of participant

Signature of researcher

Date: 17/09/18.

Date: 20/09/2018.

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, MOHAMMED ESSACK (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

MOHAMMED ESSACK

Patricia Ningi Sibisi





Signature of participant

Signature of researcher

Date: 17/09/2018

Date: 20/09/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, S. Bernal (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.


I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

Susan Bernal

Patricia Ningi Sibisi





Signature of participant

Signature of researcher

Date: 18/9/2018

Date: 20/09/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, Videsha Suman (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.


I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.


I agree to the recording of the interviews.

I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

Videsha Suman  


Patricia Ningi Sibisi  


Signature of participant

Signature of researcher

Date: 18-09-2019

Date: 20/09/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, Fiona Glover (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

Fiona Glover

Patricia Ningi Sibisi





Signature of participant

Signature of researcher

Date: 13/09/2018

Date: 20/09/2018

## APPENDIX D: Participant informed consent form

### Consent to participate

**CONSENT TO PARTICIPATE IN THE STUDY TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in the selected Technical Vocational Education and Training College.**

I, SA.VEERASAMY (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had it explained to me) and understood the study as explained in the information sheet.

I had an opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interviews.

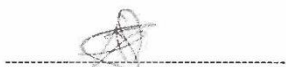
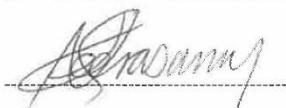
I have been assured that I will receive a signed copy of the informed consent agreement.

Name & Surname of participant (print)

Name & Surname of researcher (print)

SILAS. ANRIAN. VEERASAMY

Patricia Ningi Sibisi



Signature of participant

Signature of researcher

Date: 13/9/2018

Date: 20/09/2018



## **Appendix E**

### **Interview schedule for lecturers**

**TITLE: Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in a selected Technical Vocational Education and Training Colleges.**

The purpose of this interview is to explore the experiences in the implementation of the NCV engineering programme at Technical Vocational Education and Training Colleges.

#### **1. GENERAL**

Which programme are you teaching?

How long have you been teaching NCV Engineering?

#### **2. CURRICULUM**

Please explain the curriculum for your programme.( content and relevance to the level of the programme)

#### **3. ASSESSMENT**

Please explain the assessment procedures for your subject.

Advantages and disadvantages of the assessment procedure.

#### **4. PROFESSIONAL DEVELOPMENT**

What are the activities that you are involved with, that are meant to develop your professionalism?

Do you require more professional development? If yes, what kind of professional development do you need?

#### **5. RESOURCES block**

What resources do you require to make this programme a success? (Max 5)

Do you have relevant resources? Please explain.

**BUILDINGS**

What types of building structure you require for your programme?

## **BOOKS**

Do you have prescribed books for the programme?

How do students access books?

Are books relevant to the curriculum? Please explain

### **6. STUDENTS' ATTENDANCE**

How is the students' attendance? Please support your answer.

### **7. PASS RATE**

What is the pass rate for this subject?

If good, what is the plan that you are using to produce good results?

If bad, what can be done to improve the results?

### **8. THROUGHPUT RATE**

What is the throughput rate for NCV engineering in this campus?

Bases on the above answer explain the reasons and suggest improvement if necessary?

### **9. SKILLS SHORTAGE**

Does NCV engineering programme address the shortage of engineering skills in South Africa? Please support your answer.

### **10. SUPPORT**

**What type of support do you require?**

Do you get support? If not, what could be done to ensure that you get the desired support?

### **11. General**

What can you recommend for challenges that you are experiencing?

## **Appendix F**

### **Interview schedule and example of responses**

#### **4.3.2.1 Curriculum**

In the questionnaire, participants were asked ...

- i) Please explain the curriculum for your programme (content and relevance to the level of the programme).

Comments from the participants were as follows:

L1 Well set out programme. It starts from basics to in-depth. It covers all aspects of electronics.

L2 computer skills include theory and practical. Pitched above the students' level. Standards need to be dropped to accommodate the level of students.

L3 maths is too high for NCV students.

L4 the curriculum for EIC is good and relevant for electricians. However, the target group does not match the level of curriculum.

L5 English is relevant to the students. We cover essays, role plays, reports etc.

L6 EIC has theory and practical. Content is too high for students. Certain sections should be removed from the curriculum.

L7 maths requires someone who has completed grade 12. Maths for NCV is at the level which is above grade 12 hence students struggle with it.

L8 content is higher than the level of students. They are not coping.

L9 it is relevant to the qualification but too high for the target market. The level is equivalent to N6 which is a Diploma.

L10 not relevant to students and industry. Higher than students' level. Enrol students that do not match the programme.

L11 business management is relevant to the students and programme.

L12 contact centre operations. It is relevant to the students' level.

L13 Business foundation content is relevant to the programme.

L14 too difficult for students. It is at the university level. Some topics should be eliminated.

L15 it is intense for L2. Unnecessarily difficult.

#### **4.3.2.2 Assessment**

**Please explain the assessment procedures for your subject.**

L1 5 assessments theory and practical. Advantage is the theory assessment and disadvantage areas covered very limited as oppose to the practical assessment.

L2 6 assessments, written and project. Practical assessment. Advantage students use computer room with computers for practical assessment. Disadvantage the weighting of assessment does not encourage students to work harder.

L3 6 assessments: tests, assignments and examination. No advantages. Disadvantage it does not help students to progress.

L4 5 tasks, ICASS and final examination. DHET changed the weighting and not the programme.

L5 formal assessments and assignments. Advantage students enjoy role-play. Disadvantage since students do not have grade 12 communication in English is a challenge. Oral assessments are challenging for them.

L6 5 assessments. Weighting has been reduced which allows students to pass when their achievement does not match the results. Advantage it helps students to work on their year mark. Disadvantage it is not a true reflection of students' achievement because of low weighting.

L7 assessment is good because it helps us to see our gaps and intervene. However, with this programme it does not help because students are not at the level of understanding Maths that is used in engineering when they have never did lower level Maths.

L8 7 tasks. Advantage you can reteach. Disadvantage students obtain low marks and struggle with exams.

L9 tests, ISAT, ICASS and exam set by DHET. Advantage is it is well planned, disadvantage nothing has improved

L10 it is well planned with dates and topics. 4 assessments and trial exam. Advantage it has relevancy. Disadvantage it is at the university level.

L11 5 tasks 3 written and 2 practicals. Advantage practical component. Disadvantage too much work covered

L12 ICASS, ISAT, trial. Some assessments are set by DHET. Time is limited for practical. Too much marking.

L13 7 tasks assignments, tests, practicals and exam. Assessments help students understand where they need to improve.

L14 5+1 tasks assessed by subject specialist. It helps to check understanding. Student copy from each other.

L15 5 tasks ICASS, ISAT, exam. it helps with preparation. Too much assessments

#### **4.3.2.3 Professional Development**

What are the activities you are involved with, that are meant to develop your professionalism? Do you require more professional development? If yes, what kind of professional development do you need?

L1 no professional development. I have worked for years in engineering with no industry exposure. No training that is aimed at adapting to new developments of the industry. Need to do work integrated learning.

L2 no development. Need to be developed on better teaching methods and be in line with 21<sup>st</sup> century skills.

L3 attend courses and workshops. Need to adjust to the industry needs.

L4 I did NPDE and no development regarding my subject. I need skills development.

L5 planning to attend COLTECH training. I need computer skills.

L6 attended training but no certificate was issued which means it was not an accredited training. Need computer training and industry exposure.

L7 attended assessor and moderator courses. Need industry exposure.

L8 I have done NPDE and ACE Maths. I do not need any professional development.

L9 no development. I need engineering training, software change and hardware upskilling.

L10 I organise industry visit on my own. I need certification and accreditation.

L11 no development. I need to know the changes from the industry. Upskilling is needed and change of curriculum.

L12 I have done PGCE on my own. No professional development has been offered to me. I need moderator course.

L13 no professional development. I need skills to design online programmes so our students can also study online.

L14 I have completed honours degree. I enter competitions to learn more. I need moderator course, end-user and ICDEL.

L15 no development now. I need IT programming short course.

#### **4.3.2.4 Resources**

What resources do you require to make this programme a success? (Max 5)

Do you have relevant resources? Please explain

What types of building structure do you require for your programme?

Do you have any prescribed books for your programme?

How do students access books?

Are the books relevant in the curriculum? Please explain

All participants responded the same: resources are available and adequate.

Classrooms are well equipped. Workshops need computer with internet and air conditioners. Participants download relevant information and share with students. Need access to YouTube. The college purchases books and they (lecturers) choose the best books for each subject. All students get a copy for each subject. OHP camera, Proper laboratory and Excursions needed to enhance the programmes.

#### **4.3.2.5 Students attendance**

How is the student attendance? Please support your answer

In summary, all participants were complaining about poor attendance. They stated that some of the reasons are as follows:

Student did not have any place to go and they were trying their luck with NCV.

They found the programme difficult.

NFSAS not paying transport money on time.

Strikes that sometimes last a month.

The attendance rate ranges from 20% to 75%.?? The low attendance is mostly for vocational subjects and higher attendance rates is for fundamental subjects.

#### **4.3.2.6 Pass rate**

What is the pass rate for this subject?

For engineering pass rate is not good and here are the suggestions from participants:

Motivate students because extra classes do not help. Offer appropriate curriculum and better assessment weighting. Use past exam papers to prepare for exams. Use social media to assist students. Assist students who have social issues. Syllabus needs to be changed. Maths should have a bridging course. They need to plan thoroughly, adopt relevant content knowledge, engage in research and review their work yearly.

One lecturer who has 80% did not have any recipe to share but assumed that students pass well maybe because it is a language subject.

#### 4.3.2.7 Throughput rate

The throughput for campus A has been 0 since 2014 and for campus B is currently 12%. The reasons stated by participants are: The programme is too difficult for students who have passed only grade 9. Most students are dropouts from high school and cannot cope with tertiary studies. If relevant target group was enrolled throughput rate will improve. Change minimum requirement to grade 12 with Maths and pass. Programme should be linked to the industry needs.

Table 4.3 Attendance pass and throughput rates

	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15
Attendance	42%	20%	25%	20%	30%	40%	22%	80%	67%	30-40%	70%	60%	70%	70%	75%
Pass rate	20%	0%	35-50%	24%	80-85%	-20%	25%	30%	24%	50-60%	40%	90%	90%	65%	20%
throughput rate	0%	0%	0%	0%	0%	0%	0%	12%	9%	2%	12%	-30%	40%	-50%	12%

Table 4.3 shows the attendance rate, pass rate and throughput rate for engineering programmes.

#### **4.3.2.8 Skills shortage**

Does NCV engineering programme address the shortage of engineering skills in South Africa? Please support your answer

It can address the shortage of skills because it is a good programme. However, due to current challenges it is impossible to address the skills shortage. If the programme is implemented correctly, it will address the shortage of skills in the country. The challenge is that the right students do not register because they do not want to be with grade 9s. The grade 9s drop out when they realise the programme is too difficult. Target market is the problem and not the programme.

We are supposed to be enrolling grade 12 with maths and science pass. NCV is more difficult than the work for N6 that is a post matric qualification. One lecturer however stated that NCV cannot address the skills shortage because it is not linked to the industry. He further explained that NCV students are not placed in industries on completion of their qualifications.

#### **4.3.2.9 Support**

What type of support do you require? The participants indicated that:

Industry relationship. Change of programme requirements. Computer labs with Wi-Fi. Equipped library. Reduce administrative work for lecturers. Delimitation –I know they are battling and I want to avoid problems. ETDPSSETA courses. Communication among stakeholders.

Do you get support? If not, what could be done to ensure that you get the desired support?

They mention that they are getting limited support in terms of the above-required support. The campus and college management provide support but it does not reduce the challenges that are faced by NCV engineering because it is not relevant to their challenges.

#### **4.3.2.10 General**

What can you recommend for challenges that you are experiencing?

According to most participants, the programme is good as it has theory and practical components. Entry requirements need to be adjusted. Matric with Maths marks should be enrolled in the programme. Maths lecturer- mentioned that Maths for NCV L2 is



equivalent to grade 12. Mixed grades should not be enrolled in the same class. Obtain funding for budget shortfalls so that workshops are equipped with relevant machinery and tools. The specialist should be employed to coordinate the programmes. The specialist should also monitor and evaluate the programmes yearly so that recommendations are made for improvement.

**Appendix G**  
**Letter to the prospective participants**

23 Ferndale Road  
Morningside  
Durban  
4001  
25 March 2018

Dear Prospective Participant

My name is Patricia Ningi Sibisi; I will be doing research with Professor Elizabeth C du Plessis, in the Department of Curriculum and Instructional Studies towards a Master's of Education at the University of South Africa. We are inviting you to participate in a study entitled: **Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in a selected Technical Vocational Education and Training Colleges.**

The purpose of the study is to explore the experiences of the lecturers in the implementation of NCV engineering programmes. This study will assist the lecturers to reflect on their teaching and improve where necessary. The study will present an opportunity for lecturers with an opportunity to learn and share their best practices

I chose your institution as you are offering National Certificate Vocational (NCV) Engineering Programmes at your various campuses, which is the focus of my study. The approximate number of participants will be lecturers i.e. four per campus. I chose you because of your experience and excellences. I have known you since I worked at the same college for four years and realized that you are the one who can provide suitable information for this study.

One-on-one interviews will be used to conduct the study. Interviews will be recorded. Your real name will not be used in the recording but instead will use a fictitious code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings. Your

answers may be reviewed by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records. Your anonymous data may be used for other purposes, e.g. research report, journal articles, conference presentation. The researcher will store hard copies of your answers for a period of five years in a locked filing cabinet at the office for future research or academic purposes; electronic information will be stored on a password-protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Open-ended questions will be asked during the interviews that will take a maximum of 45 minutes. Interviews will affect teaching and learning and will request suitable from you. I request permission to auto record the above mention activities.

Being in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given the information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason. The study will assist the Academic division, curriculum manager, management at campuses, lecturers and academics to strengthen teaching and learning in the NCV engineering section.

This study has received written approval from the Research Ethics Committee of the College of Education, UNISA and approval from Department of Higher Education. Copies of the approval letters can be obtained from the researcher if you so wish.

If you would like to be informed of the final research findings, please contact Patricia Ningi Sibisi on 0827584579 or Esibisp1@unisa.ac.za. The findings are accessible for publication after completion of the study. Should you require any further information or want to contact the researcher about any aspect of this study, please contact the above-mentioned researcher. Should you have concerns about the way in which the research has been conducted, you may contact my supervisor, Professor Elizabeth C. du Plessis at 08280923903 or dplesec@unisa.ac.za . Alternatively, contact the research ethics chairperson Dr M Claassens at mcdtc@netactive.co.za of the College of Education Research Ethics Review Committee.

Thank you for taking time to read this information sheet and for participating in this study

Yours Faithfully

Patricia Ningi Sibisi (Ms)

## Appendix H: Ethical clearance certificate



### UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2018/08/15

Dear Ms Sibisi

**Decision:** Ethics Approval from  
2018/08/15 to 2021/08/15

**Ref: 2018/08/15/34050647/02/MC**

Name: Ms PN Sibisi

Student: 34050647

**Researcher(s):** Name: Ms PN Sibisi  
E-mail address: Esibisp1@unisa.ac.za  
Telephone: +27 82 758 4579

**Supervisor(s):** Name: Prof EC du Plessis  
E-mail address: dplesec@unisa.ac.za  
Telephone: +27 82 809 3903

#### Title of research:

**Lecturers' experiences in the implementation of National Certificate (Vocational Engineering) in a selected Technical Vocational Education and Training College**

**Qualification:** M. Ed in Curriculum and Instructional Studies

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2018/08/15 to 2021/08/15.

*The low risk application was reviewed by the Ethics Review Committee on 2018/08/15 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and



Open Rubric

University of South Africa  
Preller Street, Muckleneuk Ridge, City of Tshwane  
PO Box 392 UNISA 0003 South Africa  
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150  
[www.unisa.ac.za](http://www.unisa.ac.za)

principles expressed in the UNISA Policy on Research Ethics.

2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
7. No field work activities may continue after the expiry date **2021/08/15**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

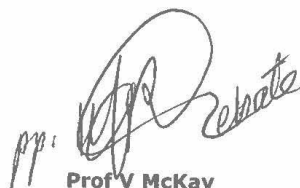
*Note:*

*The reference number **2018/08/15/34050647/02/MC** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Kind regards,



**Dr M Claassens**  
**CHAIRPERSON: CEDU RERC**  
mcdtc@netactive.co.za



**Prof V McKay**  
**EXECUTIVE DEAN**  
Mckayvi@unisa.ac.za

Approved - decision template – updated 16 Feb 2017

University of South Africa  
Preller Street, Muckleneuk Ridge, City of Tshwane  
PO Box 392 UNISA 0003 South Africa  
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150  
www.unisa.ac.za